SUPPLEMENT.

The Mining Journal,

RAILWAY AND COMMERCIAL GAZETTE:

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

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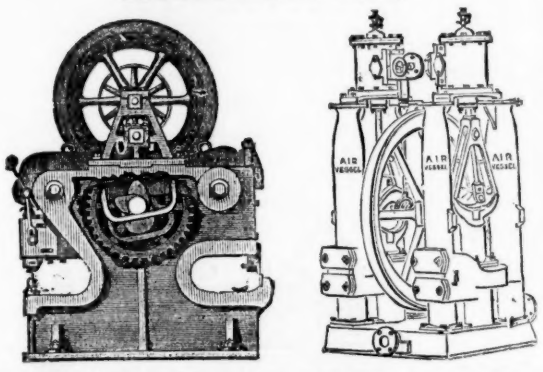

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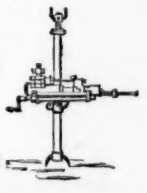

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Mr. T. B. STEWART, Manager of the Duke of Buccleuch's Mines, Wanlockhead, Abington, N.B., writing on 20th March, 1876, says—"I have much pleasure in stating that a full and superior set of your Ore Dressing Machinery has been at work at these mines for fully a month, and each day as the moving parts become smoother, and those in charge understand the working of the machinery better, it gives increasing satisfaction, the ore being dressed more quickly, cheaply, and satisfactorily than by any other method."

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Mr. C. DODSWORTH says—"It is the very best for the purpose, and will do for any kind of metallic ores—the very thing so long needed for dressing-floors."

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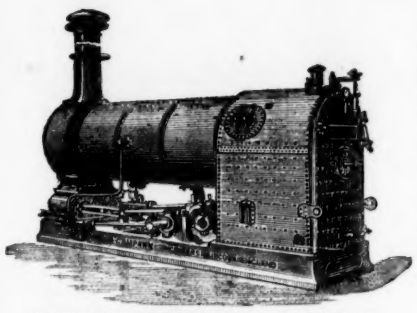

THE PATENT ROBEY FIXED ENGINE AND LOCOMOTIVE BOILER COMBINED,
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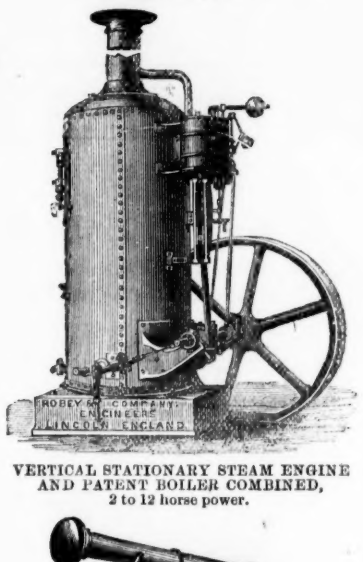

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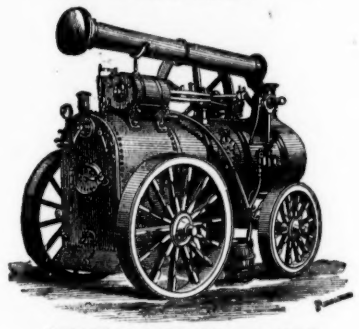

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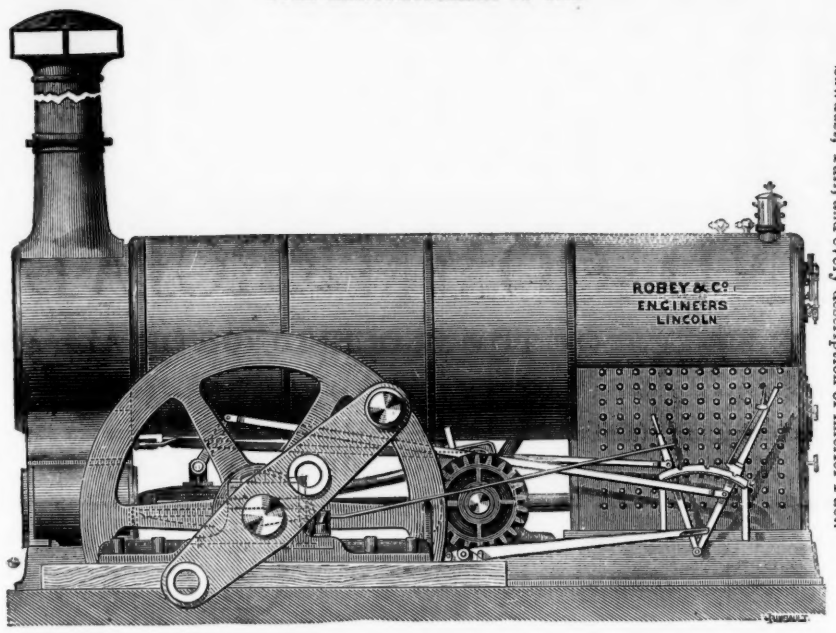

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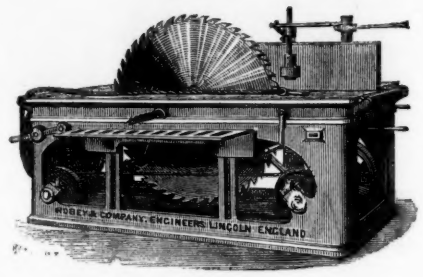

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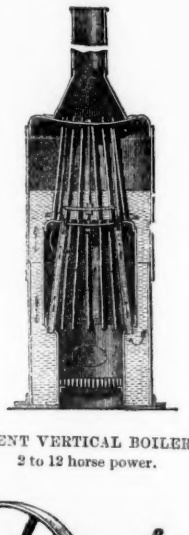

PATENT VERTICAL BOILERS,
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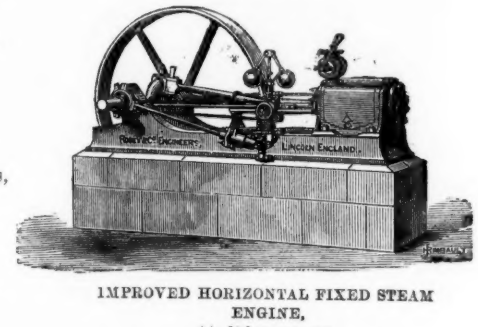

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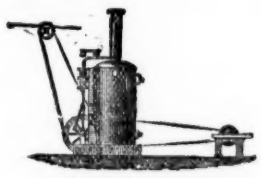

STATIONARY ENGINE.
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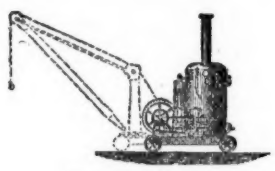

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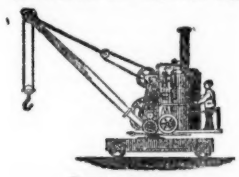

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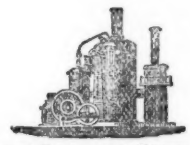

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Sanctioned by H. M. Government.

WINDING AND PUMPING ENGINE.
to 20-horse power.

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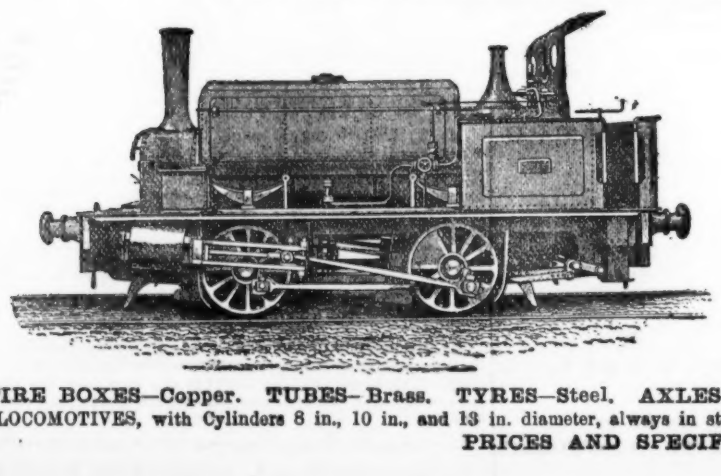

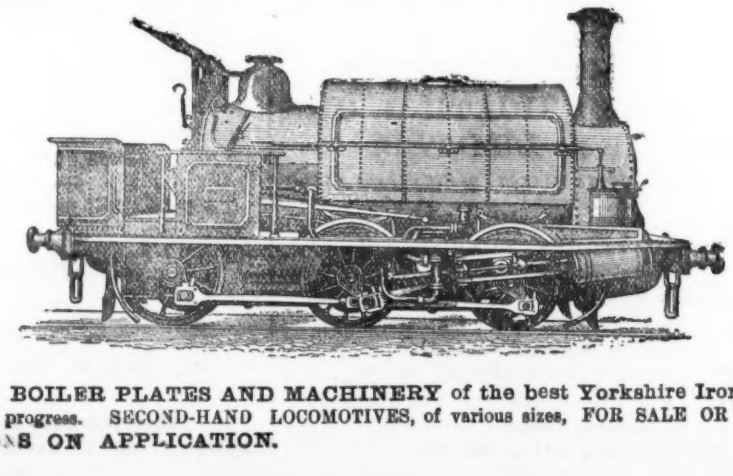

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NEW LOCOMOTIVES, with Cylinders 8 in., 10 in., and 13 in. diameter, always in stock or in progress. SECOND-HAND LOCOMOTIVES, of various sizes, FOR SALE OR HIRE.
PRICES AND SPECIFICATIONS ON APPLICATION.

Original Correspondence.

COMMERCE IN THE SUPERIOR METALS—FIRST MONTH OF 1878.

The confident expectations entertained during the last quarter of 1877 that the opening of the present year would initiate a great revival in the metal trade have not been realised. Business since Jan. 1 in nearly every department has been depressed, and metals and mining shares have severely indicated the depression. What the commerce in the superior metals with other countries has been the Board of Trade returns just issued will authoritatively show; if not with absolute accuracy, with as near an approximation to it as the books of the Custom House can record. In reviewing the elaborate tables we shall discriminate, and separate the details, so as to enable the reader to take a clear and complete view of the facts. It will be recollected that throughout the last year, while prices declined in this market, our foreign commerce in the superior metals was not, on the whole, less than in the previous year; indeed, the low prices tempted purchases, and the value of money was so low as greatly to favour speculative buyers, having been as cheap in the open market this time twelvemonths as 1½ per cent., and never having been higher in Lombard-street than 4½ per cent., and that only for a single week. The war was the real cause of the stagnation of business, and it is agreeable now to feel that peace has dawned not only upon the theatres of battle, but upon the apprehensions of the neutral nations.

Certainly there is not a definitive peace, but an armistice has been concluded, and a conference of nations called, and there is no longer room to doubt that a peace in which England will acquiesce is sure to ensue. The long deferred hope may now be rationally entertained that trade will revive, that the pick and hammer of the miner will resound throughout the land, preparing ore for the smelter, whose furnaces will send it forth to enrich not only the merchant and investor but the country at large. It is easy to believe that had last month opened as this month has with an armistice based upon terms of peace the metal trade would have been more animated—as it is the following facts are disclosed. The total value of imports of all commodities whatever was 30,609,956*l.*, with the value in 1876, but about 2¼ millions less than in the opening month of last year. The exports of British and Irish produce were of the declared value of 15,423,916*l.*, over half a million less than last year, and 1¼ million less than the year before. The value of the imported goods exported again was in round numbers one-tenth of the whole. This is about the usual proportion, and should be taken into account when considering the difference between imports and exports.

In metals, lead continued steadiest in price, and the home trade fluctuated less in than in any other metal. The import of lead is an increasing one, although there is also an augmentation in British production, but the latter by no means keeps pace with consumption. In January, 1876, lead was imported to the value (in round numbers) of 95,000*l.*; in the same month last year 170,000*l.*, and last month to 202 000*l.* This did not arise from augmented prices, the quantities rose in proportion. Of this import there is no record in the Custom House tables that any was reshipped. The exports of British lead were valued at 47,755*l.*, a decrease of about 33 per cent. as compared with January, 1877. This arose from a great decrease in the demand for China, Hong Kong, and Australia, although the shipments to India had been heavier, and the demand for France increased in the enormous proportion of three-hundred fold. British-India was our best customer, China and France following. The extraordinary increase in the French proportion arose from the fact that our neighbour purchased in January, 1877, only to the value of 21*l.*; in fact, took only a single ton.

The copper trade fluctuated greatly, and the year opened with prices inferior to those of last year. The value of our imports of ore was 71,624*l.*, not far from twice as much as in the corresponding month of 1877, although below the average. Of this ore Chili sent us none, Canada having been our chief resource. Regulus, including precipitate, was valued at 55,302*l.*, about 25 per cent. more than last year, but far below recent averages; unwrought or part wrought 107,000*l.*, against 200,000*l.* the previous January, and a great reduction upon the usual imports. It is remarkable that Chili sent hither no regulus this year, although usually a large exporter to us of copper in that form. Of unwrought or part wrought she sent about 47 per cent. of the whole; last year she sent about 105 per cent. of the whole. The falling off is due to the absurdly high price at which Chili copper was maintained. As a consequence of this state of things stocks in Chili are reported to be very heavy. Of the copper wrought and unwrought which we received the value of the re-export was 89,324*l.*, against 76,767*l.* in the corresponding time last year. It appears then that we imported less wrought and unwrought copper, and re-exported more with a profit. This is hardly unfavourable to the metal trade, and is certainly in favour of British copper miners.

The export of British copper—or as the Custom House officials put it British and Irish—in cakes, ingots, and slabs was of the value of 121,335*l.*, an improvement of about 60 per cent. in comparison with January, 1877, and a very much greater improvement as compared with January, 1876. The best customer was France, which country, as in the case of lead, marvellously enlarged its imports. Holland made a fair advance, and Belgium increased more than threefold, but this form of the copper trade with the United States appears to be extinct. Wrought or manufactured copper was sent abroad to the value of nearly 90,000*l.*, about 10 per cent. below last year, but above the average. Here, again, France afforded the most notable increase among our customers, multiplying her imports 50 times over as compared with the corresponding period last year. Russia for military purposes increased her imports twentyfold; Germany nearly doubled hers, stocks there having been greatly reduced on Russian account. But Turkey fell away one-half, Egypt one-third, and British India considerably. The United States increased minutely her custom in this department of the copper trade, but the amount of this business done with the Union is not of any importance, and seems destined to cease altogether. The Western Hemisphere will henceforth supply itself with all forms of copper products, and in a considerable degree supply this market. The exports of mixed or yellow metal sheathing, although above the average 79,405*l.*, shows a falling off from last year's return 93,559*l.* The total value of our copper exports for January was 299,111*l.*, nearly 20,000*l.* more than in that month twelve months, and about 74,000*l.* more than in the first month of 1876. Foreign commerce in the direction of the copper trade has not been unfavourable. The lowest price at which Chili bars have been quoted since this year commenced was on Jan. 12 and 19, 65*l.* 10s.; and the highest was on Feb. 2, 66*l.* 10s. Wallaroo was steady at 75*l.*10s. the lowest; but on Jan. 6 and 19 it was 76*l.* This month opened at 75*l.*

Brass manufacture, not including ordnance, was valued at 36,641*l.*, an increase of 20 per cent. over the same space of time at the opening of last year; there was wasno import of this material. The converse, however, holds as regards pyrites of iron, copper, or sulphur, there having been no exports, whereas the imports were valued at 112,226*l.*, a considerable decline from last year, and a heavy one from the year before.

The tin trade and tin mining throughout the year showed an uncertain and unsettled condition. Prices increased at one time, taking a bound upwards, followed by a relapse; but at present gentlemen engaged in tin mining take a hopeful view of the situation. The value of our tin imports for January in all forms—blocks, ingots, bars, slabs, and regulus—was 82,726*l.*, somewhat less than in 1876 during the same period, and about that extent less than in the corresponding time of 1877. Of this imported tin an unusually large quantity was reshipped, being five-eighths of the whole, valued at 51,937*l.*, against 23,000*l.*, in 1876, and only 12,000*l.* in 1877. It is obvious, then, that the imports have not weighted the market, and that the lower quotations now than at this time last year must be otherwise explained. Our exports of British tin increased another argument furnished against the common complaint that the market was run over by Straits ond Australian tin. The sales for January for foreign commerce were valued at 26,000*l.* against 21,000*l.* in the same month of the preceding year. The highest price for Straits since this year opened was obtained on Feb. 2—65*l.* 15s.; the lowest—64*l.* 5s.—on Jan. 12, a plain indication that the price of tin is looking up, and that the prospects of the Cornish miners are more enlivened. All our customers but Turkey and the United States took more from us. Russia more than trebled her insignificant imports, but there were no matters of importance in the occurrences by which the course of this commerce was marked.

Foreign spelter was admitted, crude and in cakes, to the value of 64,375*l.*, an increase of 50 per cent. Manufactured or unenumerated, 27,559*l.*, an increase of nearly 30 per cent. It is surprising, seeing the new uses, especially for building purposes, to which this metal is applied, and that our own production is so restricted, that the imports do not increase more rapidly. British zinc or spelter was exported to the value of 15,698*l.*, against 8774*l.* last year, and rather less the year before.

Our commerce in quicksilver, which had declined so rapidly, is again improving. The imports for January were of the declared value of 56,757*l.*, more than twice the worth of what was imported in January, 1877. Of what we received, the re-exports amounted to over 17,000*l.*

From these statistics it is obvious that neither British miners nor British metal merchants have cause to complain of the course and character of our foreign commerce in the superior metals, and it must be obvious that if peace be finally ratified, without any elements of future conflict left behind, we are on the eve of a great revival in the metal trade, and consequently in British mining, to the pursuit, progress, and prosperity of which the advocacy of the *Mining Journal* is devoted.

THE GROWTH OF MINERALS.

SIR,—May I intrude on your space by a few remarks upon this newly ventilated subject? Although the fact has been known for years, no one has had the courage to publicly announce it, until Mr. Readwin had the fearlessnes, by his indefatigable industry, to make it known to the world.

It is only within the last few days that I had the pleasure of seeing in the Mineralogical Magazine two papers, written by my old and valued friend Mr. T. A. Readwin, upon the "Mineral Growth at ordinary Temperatures and under ordinary Conditions," which has called to my mind several circumstances that have occurred to me where such have, and others may have, been clear evidences of such *growths* (if the term will be allowed, but I know of no other that expresses the fact, as to grow "is to increase in size or stature by natural or vital process") having taken place. I will simply recount them in confirmation of Mr. T. A. Readwin's now published discovery.

In 1852, while in the southern counties of California, I was at the head of the River Mariposa, and there found rather a large company of men washing the bed of the source of that river, and, as is usual in such cases, enquired what was the result of their labours, and was informed that their diggings yielded an average of $12 per day per man, and they showed me some of the gold procured, which was of good quality and in fair sized grains. They informed me that it was the third year they had workod upon the same stream, and with nearly the same results. I at once hinted that on the two previous occasions they must have worked very carelessly to have left so much valuable stuff behind, but they assured me that such was not the case, and that the gold grew there; for as soon as the snow set in at the commencement of November they ceased working, and did not return till May in the following year, when the snow had gone, and on resuming their work they found the gold had grown in the winter, as I then saw it.

On my first return to England from California, in 1854, I was asked to go over to Ireland, to examine the gold formations in the county of Wicklow, which I found to be very satisfactory; but the various ancient laws respecting the working the precious metals in Ireland, and these in particular, precluded the possibility of their development. While there I came upon two men who were working on a small stream in the township of Ballytemplemore, which empties itself into the Avoco river at the "Wooden Bridges," but the name of which I now forget. These men were Paddy Kelly (who was a man about 45 years of age) and his man; and after some long talk with Kelly I asked him to come to the hotel at Arcklow in the evening, as I wanted to have some further conversation with him, and to bring a sample of the gold he found. He came, and a very interesting conversation I had with him, and found that his gold washing, and that of his father before him, had been entirely confined to three miles on the above-named stream, upon which they had worked for years, with nearly the same results, and it took them about three years, or a little more, to work down this stream; and when they got down to the Wooden Bridges they stopped, and recommenced at the head of the water. I was, of course, astonished at the information, but poor Paddy Kelly met my astonishment by simply saying "Shure, and it grows there." And this, indeed, would appear to have been the case for many years, as he had been working with his father from his boyhood, which must have been the best part of 40 years, irrespective of the time that his father had worked there before he was born.

On returning to California I visited several mining districts in the counties of Nevada, Plumas, Yuba, and the adjoining neighbourhood, in 1862, amongst which were those in that singular formation known amongst miners in the district in which they are situated—near Forrest City, in Yuba County—as the "Cement Diggings." This cement is composed of a compact deposit of a greenish gray colour, somewhat resembling our pipeclay, but much harder. I do not know where to class it geologically.

This material has produced very large quantities of gold, but the precious metal is not usually seen when the material is first brought to the surface; it is, therefore, mined during the summer months, and exposed to the full action of the air, which probably allows it to throw off some of the sulphur. The heaps of stuff so mined are exposed to the full action of the severe frost and snow of the winter, during which it appears to grow the gold, for in the spring, when the heaps are unfrozen, visible gold is found through the whole of the massive piles, which was not perceptible when the material was deposited on the surface during the previous summer. The metallic germs must have been there, but it is clear that they had not matured their growth till exposed to the action of the frost and snow for at least six months. The altitude of these cement diggings is about 5000 feet above the level of the Pacific, and the depth of snow, which begins to fall in November, and goes on through the winter, varying in thickness from 10 ft. to 20 ft., the thermometer standing at from 4° to 20° of frost for months, which penetrates the heaps of material, acting on the mass, together with the dissolving snow in the spring, appear to effect the change that does take place, and which is perfectly perceptible in May, when the snow is dissolved, the whole mass having then undergone a perfect change.

On the north fork of the River Yuba, which is at a greater altitude than the cement diggings, and therefore subject to a greater degree of cold, I visited some river diggings above Downiville, and below the great slate cleavage through which the river runs, and which forms a great feature in the geological formation of this district, and which is a complete cleavage of a massive slate rock, which stands at least 200 ft. above the present water flow, the irregular sides of which appear as though they would fit into each other as cleverly as would the joints of a child's puzzle. These diggings had been worked for five years by American companies, and had been abandoned by them; but at the time I saw them, in 1862, they were being worked by a Chinese gang at a very good profit, this being the sixth year. It may, therefore, be fairly supposed that there must have been some growth during the winter which would cause this continuous reproduction year after year. The slate rocks above these diggings could not have contributed to the recuperation of the gold.

These interesting papers of Mr. Readwin's caused me to carefully examine some quartz samples that I had not looked at for four or five years, and after washing them carefully I was was perfectly astonished to find the change that had taken place, for not only were globules of gold shown on the surface that I had never observed before, but the pieces that had been visible had elongated, and had grown out of the quartz, and had materially altered in forms that could not have been when they were first broken, as many of them stood out from their matrices, and which must have been broken off had they assumed the same form as they now do, one piece being fully ⅛-in. from the original stone in which it is contained.

The above are instances of the growth of gold, but I have one example of the growth of silver that came under my notice. This occurred in a mine that I was interested in at Washoe. In one of the levels which I had not visited for some days previously to this fact presenting itself to my notice. On proceeding along this level I perceived a number of glittering objects, and on examination I found issuing from a joint in the formation a vast number of very fine needles of silver, varying from ¾ to 1¼ in. in length, and as fine as a lace needle. These were thrown out, or grown out, of that joint within 14 days of my discovering them.

The production, or growth, of gold under a high temperature is a well-known fact, and is often practised by the old quartz miners in California. This is simply bringing out from the quartz any insipient gold contained in or near the surface of the stone, and bringing the same to the outside by heating the piece of matrix to as great a heat as it will stand without disrupting it, and drawing from the fire, and gently powdering it over with finely pulverised borax, which has the effect of bringing to maturity and to the surface the gold contained in the stone in small globules, thus bringing to existence that which before was latent and unmatured. This may be termed the growth of mineral by heat, in contradistinction to growth at ordinary temperatures.

In the first, third, and fourth instances alluded to the changes, or growths, appear to have taken place by the obvious agency of extreme cold. The second, fifth, and sixth growth had taken place at ordinary temperatures, and the seventh by heat, with the assistance of a reagent.

The cause of these changes is a subject that I do not attempt to account for, and I fear that it will be some time before this problem will be satisfactorily solved. JACKSON BARWISE.

30, *Grove-lane, Camberwell, Feb.* 4.

THE COMSTOCK MINES, AND JOHN W. MACKAY—"THE BONANZA KING."

SIR,—In last week's Journal is published a comparison between the fortunes of the Duke of Westminster and Baron Rothschild, and that of Mr. John Mackay—"The Bonanza King." Will you permit me to point out that this comparison—so far as it deals with Mr. Mackay's capital—is not quite correct. I have reason to believe that my old friend's income is not at the present moment far short of 2,750,000*l.* a-year, but of this amount about 2,500,000*l.* is derived from the Virginia Consolidated and California Mines, in each of which he was recntly reported to own about a half interest. As these mines are only selling to-day at the price of one year's dividends, the absurdity of putting his capital at 55,000,000*l.* is at once apparent. From what I know I believe I am not far wrong in stating him to be worth, subject to realisation of mining stocks, about 10,000,000*l.*, and that is enough, in all conscience. P.

UTAH'S MINES.

SIR,—I resided about four years in Utah, and often accompanied Mr. Henry Sewell, M.E., in his various trips of inspection in that territory. I well remember when he offered his London friends the Flagstaff Mine, of Utah, for 12,000*l.*, which sold six months afterwards, in London, for 300,000*l.* The Josemite Mine, in Bingham Canyon, was offered by Mr. Sewell for 10,000*l.* This mine is still very rich, and has produced about 60,000*l.* net profit since 1871 to its owner, Col. Johns, who died recently, in Salt Lake City. Then it is well known that Mr. Sewell offered his London friends the No You Don't (*alias* Old Telegraph) Mine, also in Bingham Canyon, for 4000*l.* This mine has produced 200,000*l.* net profits since Mr. Sewell offered it to his London friends, and it is calculated that this mine has 180,000*l.* still in sight. I am now going to bring before you another mine—the Ontario—which Mr. Sewell offered 8000*l.* for in 1873. I accompanied him also on this trip. I cannot comprehend how the English public can complain that only bogus and worthless properties have been offered by Americans and English to the London public. I here enclose the produce of the Ontario Mine. Seventeen consecutive dividends of 10,000*l.*:—

A PROFITABLE PROPERTY.—The annexed statement is an excellent showing of the earnings of the Ontario Mine from February until Dec. 15 last. With a few such mines in each of the leading districts of Utah the prosperity of the territory would be assured. It is probable that the next season will see the development of several bonanzas and the unearthing of vast bodies of mineral wealth, and it is believed that Utah's exhibit for 1878 will far outdo that of any previous year in her history:—

Office of the Ontario Silver Mining Company, 31, Broad-street, New York. Summary of official statement presented to the stockholders of the Ontario Silver Mining Company, at their annual meeting, Dec. 15, 1877—

Total gross yield, February to date, 10½ months ...	$1,577,300	
Less discount on same at average 8·84 per cent.	139,500	
Total net yield for 10½ months		$1,437,800
Less total expenses for 10½ months	492.200	
Less seventeen dividends—$50,000 each—paid	850,000	1,342,200
Dec. 15, 1877, cash on hand to balance (gold).....		$95,600

I am at present working some gravel claims in San Barnardino County. I am sorry to see such a fine property as the Holcombe Valley Company (Limited) of London, idle. My property is only two miles from this English company's works, and I would like to consolidate with them, and I am certain success would be achieved.

Holcombe Valley, San Bernardino County. E. W. TAYLOR.

NEW QUEBRADA COMPANY.

SIR,—As the usual half-yearly meeting will be shortly held, cannot some of the influential shareholders who are dissatisfied with the present management take steps to force some change on the directors? Mr. Darlington's report was issued in May last, since then, with the exception of a few low-grade cargoes of ore that have arrived, each leaving a heavy loss, nothing of any moment has been done. No doubt at the meeting a report will be given of great pretended activity, but which will, as before, amount to nothing. Our Chairman is well up in that sort of thing; take, for example, the circulars his firm issued some time ago relating to the amalgamation of the Anglo and Direct Telegraphs, splitting Caledonian stocks into A's and B's, and the same with Brightons, but this clever financing is not what is wanted when it comes to real business ability. I think our company is as good an example of gross neglect and mismanagement as could be found all the world over. Look at our managing director; is he a fit man for his post, which certainly requires energy and intelligence? the others are simply nominees. I hear that some agreement has been made with the Bolivar Company to lower the number of tons, as well as the freight, on the contracted amount for the first year; but is this all, after our having to wait three years after the time had expired for making the railway? As the local traffic bids fair to far exceed the amount expected the Bolivar can well afford to reduce their ridiculous charge of 90s. a ton, which alone is enough to swamp any mining company.

Some experiments were to be made at Swansea for the reduction of ore to regulus; surely something must be settled, yet we hear nothing. Why not employ some firm like Taylor and Sons, or others like them, who have given their whole attention to copper mining, instead of wasting time and money on teaching our lawyers and consuls the rudiments of mining; surely, if we leave them the advantage of early information to work the market they ought to be satisfied, I should like to know who it was sold nearly 4000 shares just after Mr. Darlington's arrival in England, and after it was issued bought back at 50 per cent. profit? From private information I know that if the mines were properly worked they would pay fairly well, but only a short time more as we have been going on for the

last two or three years and we shall be in the same unfortunate position as the Emma Mine shareholders.

—— A HOLDER OF 700 SHARES.

PNEUMATIC DRESSING MACHINERY.

SIR,—It has frequently been remarked that periods of depression are absolutely advantageous to mine adventurers, owing to its rendering it imperatively necessary to find cheaper processes of manipulation, which processes being retained upon the return of prosperity yield compensation in the shape of increased profits to those concerned. Now, I feel confident that pneumatic dressing machinery is destined to play an important part in the economy of mining, or rather, I should say, in the preparation of ores for market, provided only a reasonable amount of attention be given to the subject. It is more than 15 years ago that the admirable machinery invented by Berard was brought forward, and I believe that if such machinery were driven by wind power it would be beyond question the most economic that could be used.

Almost the only objection to wind power for general purposes is the difficulty of securing regularity, but in this pneumatic ore dressing regularity is quite unimportant, as there would not be the slightest difficulty in making the feed of the ore to be dressed regulate itself according to the quantity of power available at the moment—that is to say the feed apparatus could be made to deliver four times as much ore as when the wind yielded 80 revolutions per minute as when it yielded but 20. Either Berard's or Krom's machinery could be used with great advantage with wind power, and I am quite sure that any of the Cornish engineers would willingly supply a machine that would yield the wind power required. What is wanted is automatic action and a fair amount of strength. With these the precise form adopted would be of on importance.—*Feb.* 7. —— PROFIT.

ROCK-BORING MACHINERY IN CORNISH MINES.

SIR,—I am pleased, as a shareholder in many of our Cornish mines, to find rock-boring machinery after the many difficulties, at one time thought to be insurmountable, are so far overcome that Messrs. Loam and Sons are advertising in the Journal "the only successful machine ever introduced into the county, doing three times the work of ordinary miners, and at 20 per cent. less cost;" and that the machine at Carn Brea can boast of driving 5 fms. in a week, about 15 times faster than by hand labour. I well remember Mr. Dœring's first attempt at Tincroft and Dolcoath, when, after losing thousands of pounds, he had to give up, to the gratification of many who had prophesied from the first his failure, and in some instances, I fear, instrumental in the result. Nothing daunted, however, Capt. Thomas, of Dolcoath, determined to try again, with the result as advertised in the Journal by Messrs. Loam, making sure this time that no obstacle should stand in the way; so proving at the same time that Capt. Teague has since demonstrated, that boring by machinery is the system of the future if Cornish or English mining is to hold its own against foreign competition.

The Exhibition of the Cornwall Mining Institute brought into the county inventors of other machines than had before been introduced, amongst them the Ingersoll and the Roanhead. The Ingersoll, on being put on the stand for actual contest, did its work remarkably well, the Barrow and the McKean being nowhere. The Roanhead, not having a representative, did not go on. Messrs. Salmon, Barnes, and Co., the well-known engineers of Ulverston, Lancashire, makers of the Roanhead, on seeing the importance of being represented in the county, at once came forward, offering at their own expense to try their machine against all comers. Capt. Hosking, the manager of South Crofty, and Capt. Thomas, of Dolcoath, at once assented, finally South Crofty was chosen, thus showing although the Barrow was first introduced in the county by Capt. Thomas he has the interest of his proprietary at heart. The Roanhead has so far succeeded that the men working it say they prefer it to every other they have tried, not only because of its boring faster, but also because of its easy motion, owing to its elastic blow, not tiring them nearly so much as others. With the aid of the Roanhead drill three men in seven hours bored 15 holes 2 ft. 4 in. deep, 35 ft. altogether, when without the machine the same number of men could only have bored three holes from 20 in. to 2 ft., or to say the utmost 6 ft.

To show the interest felt in the county in this matter, I would say Mr. Waddington is about to introduce again the machine before tried at Wheal Agar, and eleven other mines are discussing the merits of the various machines with a view of adopting the best. It is said the Roanhead proprietors are prepared to take contracts anywhere where compressors are already planted at prices below that of hand labour, guaranteeing from three to four times greater speed.—*Camborne, Feb.* 6. —— SHAREHOLDER.

ROCK-BORING MACHINERY.

SIR,—In the Original Correspondence published in the Journal of Jan. 19 we have letters from Mr. J. Barkell and Mr. J. C. Mackay which contain exactly the kind of information required on this important subject. But in order that it should be thoroughly reliable and acceptable as practical data all apparent discrepances should be explained. I, therefore, with your permission will ask the gentlemen who have obliged your readers with this valuable information to give us a few more words in reply to the following remarks. Having for the last 40 years been engaged in contriving, making, and testing labour-saving machines I am, of course, acquainted with the extraordinary feats of strength and dexterity which can be accomplished by men and animals for a short time, but still I must confess that I am surprised by Mr. Mackay's report of a competition between men assisted by a machine and men without a machine. We are told that the machine drilled 6 in. in ten minutes, and that the men drilled 19½ in. in the same time, although in the ordinary course of work the same men only drill 18 in. per hour. This at once proves the absurdity of such comparative trials, unless, indeed, the object of the experimenters is to show that the machine is useless rather than to arrive at the truth. The race between men and machine shows that unassisted hand labour does more than three times as much as the machine; but the additional information shows that machine rate was double that of the men, and it also shows that if the report is correct the racing rate of the hand work is six times more than daily work. This, of course, is a rate which cannot be maintained, and, therefore, any comparison with it is useless, because utterly deceptive.

Mr. Barkell's report of sinking operations at the Rushen Mines is an admirable statement of facts, which will bear cross examination, and leaves nothing to be desired but further information from the same source. The mode of fixing the boring machines to the windbore of the sinking lift is novel, and especially interesting, as the work performed proves its value, yet it would seem that raising a heavy pump-lift on the axis of a circular shaft in course of sinking must be attended with difficulty, and require very special appliances to avoid injury from the blasting operations. Is the lift raised to the extent of its screw tackle at the time of blasting for a new sump, or does it remain in place with all its apendages to take its chance of destruction? It appears from the description that the wrought-iron roof surrounding the top of the windbore extends to within 6 in. of the shaft, and consequently that the strain on it at the moment of simultaneous firing of many holes must be very severe. Probably Mr. Barkell's experience will enable him to show that these remarks suggest imaginary difficulties, or that he has found practical means of avoiding all such objections.

As to Darlington's rock borers, the opinion I have long held seems to be now dawning on the mining public. They are unquestionably the most simple in construction, because there are only three pieces essential to striking the blow—the cylinder, piston, and cover. And I think it is evident that a machine of percussive action working at a high speed will be effective and enduring, in inverse proportion to the number of its parts, and since it is impossible to make a reciprocating high-pressure engine with less than one fixed and one moving portion, it is evident that no further improvement can be made in simplicity of construction, the value of which is proved by the entire absence of repairing charges in sinking a large shaft through a depth of 83 ft., or boring for the removal of 7074 cubic feet of rock in 184 hours. Surely evidence of this kind must convince miners of the old school that mechanical drilling is a means of greatly advancing mining industry, if its practical managers will learn how to use it.

As some of the Darlington drills are mounted in cradle slides, and others have the forwarding screw cut on the outside of the cylinder, it would be interesting to know which Mr. Barkell used in the work reported, and his opinion in reference to both mountings. J. B.

PROMOTORS AND VENDORS OF MINING SETTS.

LIMITED LIABILITY *v.* COST BOOK.

SIR,—I referred in my last letter to various mines, or rather alleged mines, constituted upon the Limited Liability Acts. These prominent concerns capitalised 1,097,000*l.* in shares; to pay 5 per cent. a gain of 54,850*l.* annually is required, while not one of the number has declared a *bona fide* dividend, and present no evidence of the near approach to even meeting costs of working in by far the majority of cases. Hence we are at a loss to recognise the justice in weighting such very ordinary mining adventures with some 400 per cent. free shares on working capital at starting. Had these 19 incipients, or in cases exhausted mines, been conducted upon the Cost-book principle, not 100,000*l.* would have been called up or expended by practical miners on the whole; therefore, we prefer the Cost-book to the Limited Liability Acts in the conduct of metallic mining. On the Cost-book the loss can never be more than the expenditure in the working costs; on the contrary, subscribers pay on an average 400 per cent. premium upon joining a limited liability company at starting, and when success is undefined; hence in case of failure his losses are five-fold over the Cost-book System.

A clever practitioner as a promotor avoids detection, and never owns to falsehood; he invariably conceals and thus negatives facts; the illicit constituents of a scheme are rendered indistinct, and consequently unrecognisable; damaging features are wholly omitted, while the rosiest hues and complexion are put foremost and rendered conspicuous for attraction in all modern speculations instituted upon the Limited Liability principle—in fact, money and might stifle merit and honesty. It is difficult for the law to lay hold of these wary and astute experts and financiers. They contrive, however, to build up houses and fortunes from the revenues and misfortunes of those they designate the public dupes and drones of society. These conspirators never resort to downright misstatements, and far less to detective falsehoods, in order to draw, fascinate, and inveigle investors, but on the contrary they hold in derision all those of the profession who embody an emblem of honesty in their career of financial economies. They are the recognised foes to generative progress, and consequently are despised bunglers. The master of his art "fogs" his victim—thus extinguishes reflection while he infuses delusive hopes and expectations. In the conduct of their proceedings damaging features are altogether omitted, while the best complexion is put upon everything presumptive and likely to attract investors. The prevalent notion of individual and commercial integrity embodied in the views and acts of vendors and promoters is that investors must look out for themselves, and not rely on the fictions and promises of prospectuses, circulars, and pamphlets.

These gentlemen assert that tradesmen are not compelled by law to disclose the defects of their wares, as if such were the fact half of the transactions which daily occur would become invalidated This view of the case is *prima facia* not without force and argument; but there is an essential difference between the floating of a company to unwater and work an old and abandoned copper, tin, or lead mine, and the purchase of a table, coat, sewing machine, or a Cheshire cheese. In the one case they examine and estimate the value of the article for sale, in the other the purchaser buys shares in a public company on the basis of a prospectus that *de facto* assume yet embodies none of the essential elements of security. Subscibers to limited liability companies are thus deluded, and when the issue is known, and grief is no further postponed, the designing promoters who succeed in foisting their worthless shares on the public exclaim, in apparent self-righteousness and in indignant terms—Why should we "poor innocents" be blamed for the agonies and misery of the widow, orphan, and helpless when the tradesman can ply his traffic and flourish with impunity. But we aver that the sale of a pound of beef, sugar, starch, or bread is open to inspection, and stands upon its true merits alone, while the prospectus, circular, and pamphlet introducing a mine upon the Limited Liability principle are usually fraught with insidious treason, barren of all hope to subscribers, and loaded up to actual destruction at starting. We, therefore, in the interest of mining deplore the Acts 1862-7, and recognise in its full force and integrity the Cost-book System as desirable over Limited Liability in the conduct of home mining.

We subjoin a few instances of prosperous mining on the Cost-book System:—

	Profits.	Capital.
Fowey Consols	£300 000 }	
Lanescott	230,000 }	... ... £20,000
Par Consols	300,000	700
Carn Brea	290,000	15,000
North Roskear	104,000	1,400
East Crofty	78,000	9,000
East Pool	96 880	3,120
Levant	181.500	1,750
Botallack	117,050	19,250
South Caradon	379 568	640
West Seton	253 000	18,800
East Rose	300 000	6,400
St. Ives Consols	300,000	10,105
Buller	350 000	1,280
Mary Ann	73,600	8,190
Herodsfoot	63 744	8,512
Tincroft	302,550	54 000
Dolcoath	481 420	46,000
Cook's Kitchen	300.000	5,000
Tolgus	250,000	10.000
West Tolgus	12 928	48.370
Basset	323,584	2,640
Tresavean	454,000	6.400
Friend-ship	380,000	6,400
South Frances	186,000	7,979

These are but few of the great prizes secured under the working of the Cost-book System in the South-West Peninsula, and in no instance was capitalised, so far as we can gather, any premium or purchase-money on the money subscribed, and actually expended in wages, materials, and machinery. Shares on each and all advanced to immense premiums in market value, and vast sums were made by dealing from time to time in shares, in addition to the large dividends accruing from profits. At the present time we cannot refer to a single instance of a limited liability company having recouped the subscribers the sum capitalised in the constitution at its birth. In fact, the cost-book fosters legitimate mining, while the Limited Liability Acts stimulate finance, and by far too frequently becomes the vehicles of enriching promoters alone.

In conclusion, it is very evident that the promoters of companies, upon the Limited Liability Acts, to re-open, and if possible revive, old abandoned mines on the Welsh mountains, or in other mineral districts throughout Great Britain, have truly and very sadly mistaken their avocations. There can be no question that a non-dividend mine, weighted with 40,000*l.*, 50,000*l.*, and up to 100,000*l.* premium in a capitalised company is, to say the least, pure chicanery and humbug. As, for instance, what possible gains can subscribers to Llanrwst ever acquire after giving the vendors 45,000*l.*? The whole capital paid up upon the Norwich Insurance Company is 66,000*l.*; this is a success, and the shareholders very justly reap the reward in 24*l.* dividend on the 30*l.* per share paid for the year 1877.

Had the Llanrwst been capitalised at 15,000*l.*, and the vendors been paid 4000*l.* in cash, more working capital would have been available than under the existing capitalising of 60,000*l.* Again, the Rock Insurance has a paid-up capital of 100,000*l.*, and the dividend is 80 per cent. annually. Against this pray let us take the Leadhills, the reputed best lead mine in Scotland. This company, with a working capital of 15,000*l.*, is capitalised at 120,000*l.*; dividends of 1000*l.* a month in perpetuity can only pay 10 per cent. whereas the actual money embarked for mining purposes would pay equally with the Norwich Union or the Rock Life Insurance Companies—say, 80 per cent. annually. Five years' purchase of dividends (say, 60,000*l.*) is the full value of Leadhills, as 1000*l.* a month profits would only repay the purchase money and 10 per cent. interest in ten years.

No one can question the value of the two insurance companies referred to, nor does anyone doubt that both are well worthy a high premium, and very justly they command a market advance of 850 to 1000 per cent. On the contrary, valuable as Leadhills is and probably will long continue to be, still it is a fact that within a year or so of its registration the market value dropped to a discount of 30 per cent. Hence the original subscribers have no advantage whatever from this good though heavily weighted limited liability mining company.

We unhesitatingly pronounce in favour of the Cost-book System, which capitalises only the money actually subscribed for mining purposes. Promoters and vendors should rest their hopes of remuneration upon merits and discoveries of minerals in paying quantities alone, and in no case and under no circumstances should premiums be capitalised. In the latter case they, like royalties, become permanent imposts, and no industry whatever throughout the length and breadth of the land can bear the strain. Mining as an industry pays well, and from time to time prizes occur which startle while they fascinate the greed of mankind. Many of these are now known to practicals, and are being worked legitimately, and present those healthy elements that ensure success. They are wholly disconnected with the facile and expansive promoters of limited liability companies, who fatten on capitalised premiums instead of dividends paid out of actual profits. R. TREDINNICK,

Consulting and Advising Mining Engineer.

Exchange, 66, Coleman-street, London, Feb. 4.

MINING AND MINERAL WEALTH.

SIR,—According to a statement which appeared in last week's Journal, Mr. John W. Mackay, who not more than 10 years ago was a working miner, is now said to be worth 55,000,000*l.* sterling, and to possess an income of 200,000*l.* a month, the whole of this colossal fortune has been obtained from the Comstock Mines. The Duke of Westminster is supposed to be worth 16,000,000*l.* sterling, yielding 2000*l.* a-day. The basis from which this vast wealth and income sprung was also mining, but instead of silver and gold, as in the instance of Mackay, the Duke was a miner of lead, while the yield of the ores from the mountains of lime rock in North Wales first enriched and then led to the purchase of vast lands in the Principality, thence ultimately extending into Middlesex, the increasing wealth and spread of buildings of the Metropolis giving the final impetus to his growing and magnificent property and income.

There are many other families who owe their estates, wealth, income, and titles to nobility to the mineral wealth of this country, but we do not know of a single mine that flourishes to the success of the investor unless the development and prosecution of the works be earnest, persevering, economical, and practical. Who ever heard of a Treffry, a Lyle, a Teague, a Williams, Taylor, Clymo, or Vivian giving a premium for an undeveloped or undetermined (as the late Capt. Charles Thomas termed non-paying mines) license or lease of a mineral sett?

The backbone of successful mining is not in securing shares in prospectus-puffing and circular-advocating inflated, over weighted limited liability concerns, but in entering the arena of mining at cost price, as Mackay has done in the Comstock, the ancestors of the Duke, in the Halkin Mountain and throughout Flintshire, the Taylors in North and South Wales, and the other parties named in Devonshire and Cornwall. There are numerous mines now existing which are wholly ignored and unrecognised on the London share markets, though possessing all the true and essential elements of success, that can be purchased for the amount of 5000*l.* up to 10,000*l.*, and which are wholly of the character of those which enriched and rewarded Treffry at the Lanescott, Fowey, and Par Consols; Clymo at South, West, and East Caradon, the Trelawny, Mary Ann, and Herodsfoot; the Lyles at North and West Basset, Great South Tolgus, and Kitty; Tredinnick at St. Ives Consols; Trenwith at East Crofty, and in the discovery at East Pool; the Vivians at Crenver and Wheal Abraham, North Roskear, and South Condurrow; the Gundrys at Great Wheal Vor, the greatest of all modern tin mines; Teagues, Tresavean North Downs, Basset, Tincroft, and other important concerns; Bennett, Trenow, Alfred Consols; and the Messrs. Taylors in hundred of good mines, a few only of which space will admit of mention—Lisburne, Cwmystwith, United Consols, Damsels, West Tolgus, Friendship, Mellanear, and the Crinnis. Batters, West Chiverton, Van, Pateley Bridge, and Hultafall.

It is needless to enumerate other instances of successful and prosperous mining. There are as "good fish in the sea as ever were caught;" all that is required to secure them is practical economy, earnest application, selection of sound mineral districts, and honesty of purpose. All of these elements can be combined and rendered effective under the fair working of the Cost-book system, with a total absence of capitalised visionary premiums too often allied with limited liability companies, and which unhappily cut up the very elements of legitimate vitality and growth. We are at present organising one of these cost-book companies, and all *bona fide* investors can obtain full details and prospectus upon application. R. TREDINNICK AND CO.,

Dealers in Stocks and Shares.

Exchange, Coleman-street, London, Feb. 6.

HOME INDUSTRIES—NATIONAL WEALTH—No. IV.

"Peace! Peace! thou blessed Peace! thy countenance so bright, and form so fair, to struggling mortals, why is thy visage marred to potentates, or tyrants, whose jaundiced eyes can see in thee no beauty; and, therefore, haunt thee from the world? Oh! blessed Peace! thy reign has long been sought. When will thy wings be fully fledged?"—ANON.

SIR,—Our time in this paper does not admit of detail, and certainly such a rambling one would not be expected to do so. Tin, agriculture, iron, and coal we have already mentioned, but who could make a book to estimate the national advantage on these productions. War, however, has been a bane to all industries except those which are destructive. The manufactures of cannons, cartridges, rifles, &c., have for some time past been those which have been most prosperous, and the thought that enlightened civilised Christian Europe should in the last decade have spent over 1,500,000,000*l.* in war makes one shudder. The desolated homes, the murdered men, the fatherless children, besides the widows, the barren fields, and declining trade and commerce, all show too plainly the misery brought on mankind by this demon war. It would be a happy circumstance if the villians who made it should have to fight rather than draw hundreds of thousands of harmless men to slaughter. The time may come (but now appears distant) when the nations shall learn no more war, though Mr. Bright and others have long advocated it.

Industrial war—we mean that of capital and labour: it really now appears as if labour is nearly as prostrate to capital as Turkey is to the holy Czar of Russia. We do not mean to draw an analogy or speak of merits, or enter into a contest of might or right, but this we know—that gold locked up eats no bread, nor earns it, and still remains the same. Men's mouths require the bread, and cannot do without it. Miners, masons, and artisans of every kind will, therefore, soon have learnt their lessons, dearly paid for. Commercial war is healthy, and honest competition collectively is its sinews and stiength. Political war, too, when men from honest principles debate, and not for love of power or place, is useful, but it is sad that for aggandisement, even to the sacrifice of England's weal, this war may be continued.

The digression we have made we hope we may be excused for under present circumstances, and confess we are ourselves rather in a muddle. We hope, however, being in the ditch, some good Samaritan will pull us out. We intended to say something in this letter as to our lead mines, but thinking of peace and war, and how much lead has been used to kill men, and how much has not been used because they have been killed, we have almost forgotten our theme. It was, however, many generations ago when lead mining became a great national industry, and it is said that the New River to London was

made on account of the successes of its promoter, who had made his money by lead mining—Sir Hugh Myddelton, we mean.

Lead mining still continues, and a very successful industry too, to the present date. Some drawbacks there are to shareholders who have been induced to take a counterfeit for a genuine coin. There are however, we believe, many progressive lead mines worthy of attention. Our attention has been called to some in Yorkshire and Wales of late, promising to be very successful. In Cornwall, too, where silver in lead is found, some new ground has been opened in the very heart of the richest mines of East Cornwall, containing the lead lodes of Trelawny, Mary Ann, and other rich mines of the neighbourhood. We have ourselves seen one of these lodes opened on at different points for a distance of nearly one mile, in virgin ground, where at every point the gossan and lead samples are such as are seldom seen. Mining in Cornwall is now at a discount, tin being so low; we are, therefore, glad to know that in the St. Ives district Bicton Consols is destined to be of some benefit, and add an atom to our home industry and national wealth. T. VOSPER.

Finsbury Chambers, Feb. 4.

LEAD MINING IN THE NORTH OF SCOTLAND.

SIR,—I have just read a letter in last week's Journal signed "C. E.," which gives information relative to a lead lode near Lorsiemouth. "C. E." speaks of this lode as though it were already generally known, but in so doing I think he is mistaken. Speaking for myself and several friends who are interested in lead mining, we should be glad if your correspondent would furnish further particulars of a property so exceptionally situated as regards the carriage of its produce. Is it intended to invite the public to take any share in the concern?—*London, Feb.* 5. C. A. M.

LEAD MINING IN THE NORTH OF SCOTLAND.

SIR,—In these times of accumulation of idle funds, and the set made of not going into any foreign ventures, one is glad to see that there is a chance of employing one's money usefully at home. Therefore I hail with pleasure the new lead mine in Scotland. Who would have thought to find one there? The particulars about it are not sufficient, and one would like to know more. Is there really such a quantity of easily worked ore that it will pay to work it with a profit? Is a large capital required? Is it to be put out for a public subscription. Lately, a good result has come by some new lead mines in Wales. I should like to have some further information about this mine. Perhaps your correspondent, "C. E.," may give us these particulars, as other friends, too, might entertain a sound home investment.—*Feb.* 6. BETA.

THE MINERAL RESOURCES OF IRELAND—No. II.

SIR,—Leaving the panoramic splendour of Glendore, with its beautiful, tranquil, and land-locked harbour, its gently sloping hills and magnificent sylvan surroundings, and proceeding westward near Castletownsend, the Bawnies Hall Mines are reached, where the ancients discovered copper ore, and after in the good old times, when the various industries of Great Britain were in the full swing of prosperity, and the price of copper was much higher than it is now, shafts were sunk and attempts made to obtain copper ore in paying quantities, which, however, owing to some unexplained cause, were unsuccessful, and the mines were consequently abandoned. The Ballydehob mining district extends from about six miles west of Skibbereen to the village of Skull, a distance of seven miles. Some of its most productive mines are fringing the sea. The islands of the coast also have produced copper ores, while some distance inland metaliferous lodes and deposits have also been discovered. The formation of the coast is clay-slate, and the metallic substances of commercial importance hitherto procured are the following varieties of copper ore:—Erbusite, a sulphide of copper and iron ($3\ Cu_2\ S_3\ Fe_2\ S_3$), containing in very pure samples about 70 per cent. copper; copper pyrites ($1\ Cu_2\ S\ Fe_2\ S_3$); and malachite, green carbonate of copper, ($Cu_2\ C_3 + Cu\ H_2\ O_2$), composed of oxide of copper; 71·8, carbonic acid 20; and water, 8·2 per cent.; barytes ($Ba\ SO_4$) is also obtainable in quantities in this district.

Five of the principal mines yet opened on are on the same band of mineralised ground, and are named as follows:—Roaring Water, Kilcoe, Cappagh, Ballycumisk, and Skull Bay Mines The Roaring Water Mine is three miles east of Ballydehob, on the east shore of Roaring Water Bay. It is advantageously situated for opening up cheap, as a good water supply for mechanical and other requirements is at hand. Near the surface black oxide of copper and grey copper ore were the products of the lode, but as the workings decended these ores gave way to copper pyrites. Some years ago, however, operations were suspended, it is said for want of working capital.

Kilcoe Mine lies 1½ mile west of Roaring Water Mine, and on the same mineral course. The lode was proved over 50 fms. deep by the Mining Company of Ireland, who, however, abandoned it many years ago. Several small lodes and beds containing copper are observable also in the vicinity. Cappagh and Ballycumisk Mines, situated still further to the west, on a continuation of the Roaring Water and Kilcoe copper country, have been worked extensively, especially the latter. They contain nine lodes in all, three of which have proved rich in the Ballycumisk Mines. The lode called Baryta lode, however, is the principal, being of greater proportion than any other in the mines. The gangue is composed of heavy spar and quartz, and the mineralised copper pyrites—redruthite and erbusite (grey and purple copper ores)—have also been obtained in quantities from the lode called Lady vein, on which the shaft is sunk. The development of these mines for many years gave remunerative employment to numbers of industrious natives, and Cornish officers conducted the operations with considerable skill. The dressing of the ores, however, is attended with difficulty, as a portion of the veinstone is barytes, which has a specific gravity of 4·5, while the copper ore has a specific gravity of 4·3. Their separation by washing can, therefore, be but very sparingly effected, and I have never heard that any chemical process was brought to bear upon them, though the ores may be advantageously converted into soluble chloride, or sulphates dissolved out in water and precipitated in the metallic state by means of scrap or pig-iron, which are abundant and cheap in these counties. In this way low-class ores, when obtainable in large quantities, could also be turned to good and profitable account.

The Skull Bay Mines on the same run of lodes as the above-named mines, are situated on the east shore of Skull Harbour; this also is a good old mine, and has, like Ballycumisk, yielded large quantities of rich copper ore. There are 10 or 11 lodes within the set, and operations were first commenced in 1839, since which time, though not continually going, it has enjoyed a fair amount of prosperity. Purple, grey, and yellow copper ore with malachite are the products of this mine. On the Ballydehob coast copper lodes and cupriferous shales have been discovered in Long Island, Castle Island, and Horse Island, the extent and nature of which in the latter place gave rise to the sinking of shafts and other explorations; considerable quantities of good purple and yellow copper ore were raised, but, like many other feeble attempts at mining in Ireland, this too has come to naught.

West of Ballydehob there are two lodes in which copper was proved, and one of them was found to be rich near the surface; it was worked with vigour for about four years, during which time it yielded several thousand tons of high-produce copper ore, that was shipped to Swansea; the changeable nature of the lode as the workings descended, however, dispirited the adventurers, who abandoned the enterprise. Three miles north-east of Ballydehob, near a place called Ballybane, in beds of cupriferous shale, there are Danish or old men's workings, but modern enterprise has not extended itself to this place so far as I am aware. Two miles north of Skull Harbour, and on the east of Mount Gabriel, there are several copper lodes; operations were commenced on them about 25 years ago, but only on a small scale, which were insufficient to the end of proving the mine, there is also in the same place a lode of barytes that was in like manner worked. Three miles north-east of the Mount Gabriel Mines, at a place called Derrycarhoon, copper ore was discovered, and two miles still further east, and on the same range of country at Shronagree, mining operations were carried on for copper, yet only in a small way. Two miles north of Mount Gabriel Mines, at Drienlamore, are some very valuable sulphate of baryta mines; they produce annually large quantities of superior barytes free from iron oxide. It is shipped away from Dunmanus Bay, near which the mines are situated, and in which is good and safe anchorage where ships of large tonnage may discharge and take in cargoes.

The Ballydehob mining district has attracted the attention of capitalists for the past 40 years, and its copper mines have often largely contributed to the sales of ores at Swansea, and though some of its mines have been worked with skill and sunk to considerable depths, yet it remains up to the present comparatively unexplored. True it is trials have been made and mining operations carried on in many and various places, but as a rule the money subscribed fell miserably short of what in any other country would be regarded as adequate working capital. THOMAS TONKIN.

Birmingham, Feb. 6.

MELLANEAR MINE.

SIR,—It is very gratifying to find there is still corn in Egypt. Having business in the neighbourhood of Hayle, a few days ago, it occurred to me I should like to take a peep at the Mellanear Copper Mine, a short distance from the celebrated steam-engine works of Messrs. Harvey and Co., Hayle—about ½ mile south of the port of Hayle. The Mellanear Mine is a sett between three mines of great celebrity in past days, and on the same great champion lode as the Great Alfred and Alfred Consols Mines, which yielded several hundred thousand pounds sterling in value of rich copper ores; the mine west of Mellanear sett was a mine left off in its infancy, some 40 or 50 years ago, on account of the insufficiency of its machinery, I was informed. The Mellanear ore is of low-quality compared to the ore raised from the eastern mines, but as the mine deepens the ore appears to improve in quality, which clearly shows that the operations are skimming, or on the top of a great deposit of mineral. This mine is situate north of the so-called Marazion district, and from two to three miles only from the once celebrated Wheal Fortune, which in the recollection of the writer of this letter sold as much as 600 tons of ore bi-monthly, which fetched 37*l.* 18*s.* 6*d.* per ton, and had Mellanear ore been of equal quality the profits annually would be enormous, notwithstanding the low price metals are fetching at the present time—lower than at any period during the last fifty years. The writer once heard a gentleman of great experience in mining matters state, "There will mines be found in all ages, but it is not for all men to find them." This great discovery in Mellanear Mine clearly proves that Cornwall is by no means exhausted of its mineral treasures, as there is a large tract of ground south of the Mellanear Mine still unproved, and containing a great number of parallel lodes, little or nothing done to prove them much below the surface. About two miles south of the old Fortune Mine is the Old Neptune sett, about one mile east of Marazion, which gave a profit to the shareholders of 24,000*l.* in twelve months after the discovery of the mine was made, with an outlay of about 1000*l.*; but this sett is but very partially proved, in fact, the smallness and inefficiency of the machinery at that period used only enabled the company to take away the top of the deposit, and by what the practical miners of the district say, the great bulk of the ore is still for a future company to work. Many parcels of the Old Neptune ores yielded from 30 to 50 per cent. in metal; lode from 5 to 10 ft. wide on an average. When this mine was first discovered steam-engines were very scarce, and could only be obtained at a great cost from Boulton and Watt's works in Glasgow. Iron pumps, or pitwork, at that period cost 18*l.* per ton in South Wales, but can now be purchased at from 2*l.* to 3*l.* per ton in Cornwall, ready made, and no delay. Should any party feel disposed to embark in a legitimate undertaking as much capital as formerly is not required to start a mine; where shafts have been sunk and discoveries made a third, or even less capital only is required to purchase efficient machinery, and in a short space of time send the minerals to market, so that, like Mellanear Mine, they may enter the Dividend List within twelve months of starting, and pay 10 per cent. on the capital, half-yearly, to begin with. The royalty (or dues) in Cornwall is very much less than formerly; many of the landowners are awakened to the necessity of acting more liberally, and by so doing they are also serving themselves to a certainty. There are mines in Cornwall at present yielding nothing to the owners of the land, that ought and would be paying the proprietors hundreds annually, and probably in some cases as many thousands, and afford employment where poverty and misery now exist.—*Feb.* 4. A READER.

GREAT WEST VAN.

SIR,—The letter signed by "Fair Play," in the Supplement to the Journal of Jan. 26, would not have been noticed by me because of its anonymous character, but there is such a perversion of facts and evidently an evil desire to suggest other motives to my actions contained in it, that I cannot let it pass without correcting them, and making my position as a shareholder clearly understood. The writer of the letter professes much acquaintance with the affairs of the mine; he might possibly "a tale unfold." As to my statements being all *ex parte*, I believe that any reasonable man would have more confidence in my letter-book than the memory of a "confidential clerk."

To doubt my statements under the circumstances is but to question the extent of the late Mr. Greene's confidence in his clerk. Was the confidence entire? As the "confidential clerk" appears somewhat prominently in "Fair Play's" letter, he might enlighten the public on this point. If it were entire he would, perhaps, be wise in keeping his own counsel; if it were not what he "saw or heard" argues nothing. As to evidence pointing to my not having written such letters, copies of which were given with my letter in the Journal of Jan. 12, is but another way of charging me with a falsehood. To such a charge I challenge not "Fair Play" only, but the directors and those who now hold the documents of the company to produce any such evidence. Such words of "Fair Play" unmask him, and show him as one not fit to use the *nom de plume* he has adopted. From the tone of the letter I cannot but think that the writer is a disappointed man, and a sort of "hanger-on" in the mining circle, without a position or reputation of his own, and whose only pleasure lies in meddling with other people's business, and if possible to damage the reputation of others. Mine is not in the hands of such men; it is above them. Here is a man professing to be disinterested, "having no interest in, nor ever having had any, in this company," and yet he assails me in a spirit of prejudice—and for what? Because I have taken up this matter in my own interest and that of the public with a determination to have a clearer interpretation of the doings of the directors and those connected with the bringing out of the company.

"Are my words a jumble without sense?" I think anyone with a moderate amount of common sense, which I am accused of ignoring, will perceive that a jumble has been made by "Fair Play" of my letter of Jan. 12. In September, 1873, I wrote that it was "my determination to expose any dishonest dealings towards the subscribers." Up to this time and beyond it I had not received the certificates for 1000 shares, 200 of which were applied for on behalf of my clients, and 800 on my own account, so that I could not hand over to them what they had originally applied for through me at the formation of the company. I had not only the authority of my clients to apply for the shares, but the subjoined letters confirm what I say. It is apparent, then, that as I had taken a stand against any wrong doings that the certificates were purposely kept back, and I was cajoled into taking 200 shares for my clients out of the name of the late secretary's clerk *after* I had stated that I would hold the 313 shares in trust. It is impossible to doubt these statements in the face of evidence produced, and anyone who has access to the books of the company will see that the 1000 shares, with 2*l.* per share fully paid up, are still in my name, as well as the 113 shares, certificates for which I have not received.

Respecting the dividends, mere assertions are put forward instead of proof. I wrote in September, 1873, that "the dividends, in my opinion, ought never to have been declared or paid by the directors in the present premature state of the company's affairs." In October, 1874, I wrote—"Nothing surprised me more than to learn that the directors have thought proper to declare another dividend in this mine." How can "Fair Play" reconcile his statement that I gave my proxy to the Secretary to support him in the declaration of dividends, the first knowledge of which surprised me, as well as causing me to protest against them at the time.

The conclusion arrived at by "Fair Play" is but the issue of a bewildered judgment, and were it known who this "culprit" is, we should no doubt be doubly assured of the fact. By what mode of thought it can be insinuated that I have been the ruin of the company it is impossible for me to comprehend. No one could have acted in a more straightforward manner. I have from the first, notwithstanding my transactions with the late Mr. Greene, kept one purpose in view—the protection of the *bona fide* shareholders of this company, and to the end intend to continue in that course.

As to the remarks about my "besmearing reputations" they are unworthy of comment; I hold them in contempt, together with the writer "Fair Play," who does not possess, or for some reason dares not to show, manliness by signing his name. W. WARD.

Stock Exchange, and 75, *Old Broad-street, Jan.* 31.

Torquay, January 29, 1878.

MY DEAR SIR,—I do not yet understand my position in Great West Van, but it seems to me that I was deceived by the Secretary. I agreed to take 100 shares out of the 1000 you subscribed for. I understand that 1000 shares stood in your name, that you paid all calls on them, and that 100 of such shares were to be transferred to me. We both acted on a clear understanding, but the Secretary did not obey instructions or do what he undertook to do. It seems to me that the Secretary did just what he liked in that office, and that the directors did nothing.

W. Ward, Esq. W. GILLOW.

Camden-road, January 28, 1878.

DEAR SIR,—In reply to your letter I unhesitatingly say that the certificate I hold for 100 Great West Van bonus shares were not sold to me by you, nor have I paid you any consideration for them. My interest should only be represented by 100 shares out of the 1000 you applied for in your name, and on which you have paid the calls, as per bankers' receipts. I am fully aware of the difficulty you experienced in getting matters arranged for our mutual protection at the company's office. JAMES WALTON.

William Ward, Esq., 75, Old Broad-street.

THE ST. AUSTELL DISTRICT.

SIR,—This district is one of a peculiar character, embracing as it does more clayworks than all other districts in the county combined, and also numerous mines, many of which were formerly celebrated for their productiveness, but nearly all of which are now as silent as the grave. I take the district to embrace St. Austell, St. Mewan, St. Stephens, St. Dennis, Roache, St. Blazey, and Tywardreath. You are aware that I have published maps of nearly all the Cornish mining districts, but I did not publish this, because when I issued a circular to the clay owners, &c., 20 years ago, their response was so limited as to discourage my proceeding with the work, although I had reduced nearly all the tithe maps for the basis of the map. The period which has elapsed since that issue has, unfortunately for the labouring class, brought nearly all the mines to the state described. The consequence is that unless the owners in general show fuller patronage than they did then I shall defer the publication to the year 1978, which may you live to see.

I regret to say that the clay as well as the mining industry of the district is in a very depressed condition. Most of the mines are idle from apparent exhaustion, but the clay resources are practically inexhaustible. How, then, it may be asked should there be depression in the clay trade? I answer from over production. A few years ago the clay merchants of St. Austell were making, and had made, moderate fortunes by this pursuit. The supply was then only just equal to the demand, and the merchants had their own prices, leaving good profits. A knowledge that such profits were being derived from clayworks induced numerous speculators to invest in them, and this has been done to such an extent as to cause a reduction in the price of nearly, I believe, 50 per cent. Therefore, what was a very profitable pursuit is now merely self-supporting, and in some cases a losing one. The West of England Company is, I believe, the largest producer of clay in the district; I was informed that it pays to Mr. Fortescue 5000*l* per annum minimum rent for dues on clay, and that the dues have amounted to as much as 7000*l.* per annum. There are several other large producers—Messrs. Martyn, &c.—who will stand while "the weak go to the wall."

I was in the district yesterday, and met at the Pack Horse Inn, St. Blazey, a very intelligent miner, whose name I have forgotten, and I was surprised to hear him say that Fowey Consols and West Fowey Consols, if free from water, could be made to pay. The cost of discharging the water is too serious to be undertaken, and I doubt if it will be done in the lifetime of the youngest person now living. East Crinnis was tried the second time, with a loss of 150,000*l.* I would advise speculators to keep clear of old deep mines; they never pay. Wheal Vor is another instance, the second working of which was concluded with a loss of 350,000*l.* The following mines in this district are idle:—Polgooth, a very old and formerly a very rich mine; Great Hewas (tin); Beam (tin), once rich; Cornubian, Fowey Consols, Polharmon, South Fowey, West Fowey Consols, Par, West Par, East Crinnis, South Crinnis, Pembroke, New Pembroke, Charlestown United, St. Blazey Consols, Prideaux Wood, and numerous others.

I found that the vacant dwelling houses in St. Blazey were not so numerous as might have been expected under the circumstances.

The district would not have any mine at work within it but for the mining skill and perseverance of Mr. R. H. Williams, C.E., who, under all the disadvantages resulting from the awfully low price of tin, has managed not only to make Wheal Eliza a self-sustaining concern, but to give profits. If ever you find time to visit the district I would advise you to call here to see the admirable way in which everything is arranged and conducted. The engines, which in some mines are dirty and rusty, are here kept as bright as polished silver. There is a competition between the several enginemen consequent on the graduated rewards offered for attention to the machinery. Hence the cleanliness. The dressing appliances are of the most perfect and economical description, simple meanwhile, and the accounts are kept on the best possible plan by the purser, Mr. Bradhurst I remember that, about 25 years ago, a little mine was started near Lanivet, called the "Model Mine," by Mr. C. S. Richardson, which had an ephemeral existence. In Eliza everything is so studiously and so successfully done that I commend it to your notice as a model mine. I understand that the shareholders are very few in number, and that shares seldom, if ever, change hands. Mr. Williams is a large owner in this and the three other mines under his management. When he takes up a sett he charges no premium or promotion money, as is often done, for the mine; all holders come in on equal terms. If he had chosen to do so he might have made much money in "promoting" mines, but he never charged a shilling in that way, notwithstanding the fairness of doing so. He has a prize in Wheal Eliza, and from what I learned yesterday I am inclined to believe that West Wheal Eliza, a young contiguous mine, will be another prize for him and his friends. The engine-shaft here is drained by a flat-rod from an engine in Charlestown United, distant probably 100 fathoms. This shaft is 30 fms. under the adit, which is 20 fms. deep. At the bottom a cross cut northward 3 fms. intersected a tin lode 17 ft. in width, worth at present price of tin 40*l.* per fathom. This discovery seems to justify a belief that this mine will equal its neighbour, Wheal Eliza.

Crinnis, a mine near Crinnis Cliff, is another of Mr. Williams' mines, and likely to be prize No. 3. The company has expended about 8000*l.* here. It is a copper mine. On October 4 last 52 tons of copper ore were sold; there are 45 tons now ready for sale, and 30 or 40 tons more broken. The mine is partly under the English Channel, and the water pumped out is quite as salt as the sea. The water is stopped from deeper descent by a 25 fm. level, whence it is pumped to adit, which is about level with high-water line. The lode, about 6 feet wide, is best in the 44 fm. level—the bottom one. Until lately the salt water used in the boiler occasioned a great deal of trouble, but by a fortnightly cleansing all goes on well. No fresh water is obtainable here on the gravitation principle. All arrangements at Crinnis, as at the other mines, are on the best principles in every respect. Boscundle, Great Crinnis, and Carlyon Consolidated Mines is rather a lengthy title for a mine, but that, I believe, is the name of a new work commenced a few months ago near old Boscundle Mine by Mr. Williams. It is southward from Wheal Eliza. An engine (rotatory) of 25-inch cylinder is pumping the water out of the new shaft, which is

17 fathoms deep. The water is little. The shaft is to take the Pembroke lode, which was rich one mile eastward. The intermediate ground is entirely unexplored, and is under grant to Mr. Williams. It is believed to be very valuable. I anticipate that this will be prize No. 4.

The number of persons employed in Mr. Williams' mines is from 450 to 500, a fact which will show the importance of the mines to the district at the present time, when nearly every other mine is idle. Capt. Barrett has a few persons working at Polmear Mine, near Charlestown. Having surveyed Carclaze tin and china-clay pit in this district you may expect to have my description of it on a future occasion.

There is a mine close by Fowey Consols, and formerly part of that large sett, being slightly worked under the name of New Fowey Consols. It is said to be a very promising mine. The resident agent is called, I believe, Capt. Vian, and the manager is Capt. T. Parkyn, of Roche. If the sanguine hopes entertained of its good character should be realised, the working of it may lead to the developement of the part of Fowey Consols not yet fully developed—the eastern part.—*Truro, Jan.* 31. R. Symons.

NORTH LAXEY MINING COMPANY.

Sir,—The letter of Mr. Robert Byron in last week's Journal is no answer to mine which appeared in your number of Jan. 19, and, therefore, no reply is required from me. To use his own expression, his "nonsensical remarks" bear their own refutation.

Mr. Byron, in one sentence, says that the least that can be expected of the directors "is to take due care that it (the capital) has been properly and economically made use of;" and in another, because they have lately, without having had the advantage of these views of Mr. Byron, taken a course with the object which he indicates, it is put down as a "spirit of vindictiveness!" Mr. Byron says that it is "a presumption utterly at variance with the facts" for me to state that the same proportion of the shareholders absent from the late meeting hold similar views to the large majority of those who were present. While he here admits the correctness of my description of the opinions of those present, I would ask him on what grounds he "presumes" to assert that I am wrong as to those absent? I think I am likely to know better as to this question than a person who only became a registered shareholder about five weeks ago. J. H. Murchison, Secretary.

Austinfriars, Feb. 4.

NORTH LAXEY.

Sir,—The attempt to make this a personal question is simply ridiculous. I can fully confirm what Mr. Murchison says as to the general feeling of the English shareholders in this company—they wish for a complete change in the local management, and I think this will be proved in an unmistakeable manner before long. I make this assertion upon good grounds, and upon the authority of—

Feb. 5. —— An Old Shareholder.

CORNISH MINING A PROFITABLE SOURCE OF INVESTMENT.

Sir,—Mining having shared in the depression under which every kind of enterprise has suffered during the last three years, will now undoubtedly (thanks to recent negociations on the part of European Powers) take its turn in the upward movement, and copper, lead, and tin mines must participate largely in the general rise to be expected in every kind of stock. Mines which have kept themselves afloat and paid their cost of working during the unprecedented bad times are a sufficient guarantee for the investing public that a rapid rise in such must almost immediately ensue, some having been forced down in market price to actually less than the value of the machinery on them, thus giving an opportunity to the investor to reap a rich reward, such as has not offered itself since the revival after the panic some ten years ago, when shares in such properties rose in one week over 100 per cent., and in about three months to 500 per cent., and in many cases to 800 per cent., and those who invested a few pounds reaped the reward of their small outlay in a short time. Most assuredly the present offers an opportunity for a like result; enquiries should, therefore, be made into the present state and prospective value of mines known to the writer as likely to benefit those who feel inclined to embrace the opportunity of embarking in them. Chas. Bawden.

St. Day, Cornwall, Feb. 7.

CARDIGANSHIRE MINES.

Sir,—A brighter day seems to be dawning for mining in Cardiganshire from the succession of fine discoveries that have been made of lead ore during the past few months. Beginning at the North, in Blaen Caelan a discovery at the bottom of the mine has been made, and there is a lode fully 8 ft. in width of excellent leadstuff, at least 4 tons to the fathom. At Monydd Gorddu the lode in the bottom of the mine is valued at 50*l.* per fathom. At Court Grange adjoining the lode in the deep adit is about 10 ft. wide, having a leader of rich silver-lead ore fully 2 ft. in width, and valued at from 40*l.* to 50*l.* per fathom; this is important, as the end is going into new ground. At Bronfloyd, on a parallel lode to the lode of the old mine, a discovery has been made of great value; it is at the depth of 70 fms., whilst the old mine is 60 fms. deeper. The lode is worth 5 to 6 tons of lead ore to the fathom. At South Darren, now that the dressing machinery has been remodelled and renewed, the returns are 40 tons per month, and are to increase. In the Rheidol Valley the run of mines on the celebrated old Ystumtean lodes are looking well. The Temple on the east, Tynfron on the west, and the Aberystwith and Ystumtean Mines in the centre. In the latter a discovery has been made this week at the 40 fm. level from surface going west into whole ground, worth not less than 3 to 4 tons per fathom. The leader has 6 in. of solid galena, and 1 ft. more of excellent work. The deep adit is 30 fms. under the 40 from surface, so the great value of this discovery must be apparent. Going still southwards, the important discovery already reported at Esgairmwyn not only continues but improves. The bottom of the winze has a leader of nearly solid galena 20 to 24 in. in width, and an additional width of 5 ft., with a good mixture of ore throughout. Cardiganshire bids fair to turn out some prizes this year.

Aberystwith, Feb. 5. —— George Green.

HINGSTON DOWN MINE.

Sir,—It is not often that I venture to address you on mining matters, but I cannot refrain from expressing an opinion with reference to the proceedings of certain gentlemen in this neighbourhood, and of the London directors of the above mine. From what I can understand, it appears that it has been determined to dispense with the services of Capt. James Richards, who for some years was the manager of the mine, in consequence of his perfect inability to attend to business of any kind whatever. Personally I have great respect for Capt Richards, and he has my most sincere wish that he may regain his usual good health, although from reports it is somewhat doubtful whether he will again be able to resume his duties here or elsewhere, and I should be sorry to say or do anything that could in any way be hurtful to his feelings or anyone belonging to him; at the same time, taking a business view of the matter, the whole question seems to me to absorb itself into this—How long is a company justified in retaining the services of a servant who has been for a long time so ill as to be unable to attend to the responsible duties required of him? I believe many months have elapsed since Capt. Richards was able to inspect and report on the mining properties of which he has had the charge, and if I am rightly informed I believe that he is at the present moment inaccessible to everyone but the members of his own family, that he is quite incapacitated from attending to business, let alone writing letters, to which I observe his name is attached; and I go further, to say that it is somewhat doubtful whether he is aware of the correspondence that is being apparently carried on in his name with the directors and others connected with this mine. I do not wish to enter into all the *pros* and *cons* respecting the action of the London directors, but of this I feel assured, that whatever they may have done has been with a view to economy, and as their duty becomes them, in the interests of the shareholders. Were Hingston Down as indebted as its neighbour to Capt. Richards, and its financial position as satisfactory, then, perhaps, some consideration might have been given to his past services, and something in the way of a douceur might have been originated, but in these times, when mines are struggling against low prices and high labour, and shareholders have continually to put their hands in their pockets to find the needful for developing our mining interests, it behoves those who are invested with the trust of the shareholders to dispense with all superfluous and unnecessary expenditure.—*Tavistock, Feb.* 5. Economy.

GROGWINION MINING COMPANY.

Sir,—I read with interest the letter in last week's Journal signed "A Shareholder," referring to the constant annoyance inflicted by Mr. Horsley upon the directors at our half-yearly meetings, and I consider the suggestion therein made—that a special meeting of shareholders should be held for the purpose of at once definitely settling the question of directors' fees—a good one, and one that should be forthwith acted upon. By so doing the wretched waste of time that usually occurs at our general meetings would stand a fair prospect of being prevented. If the directors act upon this suggestion, and call a special meeting, I am confident that they will obtain a great majority of votes in their favour, for I have the best reasons to know that Mr. Horsley's jealous interference is distasteful to the general body of the proprietors, who do not forget how hard he tried to obtain a seat at the board himself, and how ignominiously he failed to gain the support of the shareholders. They also do not forget that on the occasion of one of his repeated defeats he vowed that he would continue to be a thorn in the side of the directors, a vow that he has well carried out by annoying them on every possible occasion.

I can only look upon his persistent fault finding as an insult to the directors, who, as gentlemen and men of business, have laboured long and zealously for the interests of the company, and but for whose voluntary pecuniary help in times gone by the concern must have collapsed entirely. My own fear is that if this petty annoyance is persisted in much longer it will induce some, if not all, of the board to resign, and such an occurrence would be very unfortunate in times like the present. I for one should be disposed to immediately sell my shares should such an unlucky episode occur, and I have no doubt many other holders, who like myself have been interested in the company from the commencement, and have seen how well our directors have worked for us, would do likewise.

An Original Shareholder.

Meetings of Public Companies.

SOUTH DARREN MINING COMPANY.

An extraordinary general meeting of shareholders was held at the company's offices, Austinfriars, on Thursday,

Mr. William Jardine in the chair.

Mr. J. H. Murchison (the London manager) read the notice convening the meeting, and the subjoined report of the agent was submitted:—

Feb. 5.—As requested, I beg to submit the following general report for next Thursday's meeting:—Bishop's shaft, sinking below the 90 fm. level, by nine men, down about 6 fathoms; this point should be vigorously continued, as the 100 fm. level will, doubtless, open up a section of improved value compared with the 90. This opinion is being confirmed by winze sinking below the level, where the lode is masterly, and worth 3 tons of lead ore per fathom. The 100 is being driven from a winze east to effect a direct communication with the shaft, and also west under the run of productive ore ground already driven through in the 90 for over 30 fathoms in length; the steady prosecution of these points is now ensured by having adequate machinery to keep the water regularly drained. The 90 west is showing an improved appearance, and is now entering a second deposit of ore, which in the 80 was 20 fathoms in length, and worth from 15*l.* to 20*l.* per fathom. The 80 (which is from 6 to 7 fathoms behind a winze sunk 9 fathoms below the 7C) is driving towards a third deposit of ore, 10 fms. in length in that level. The aggregate length of ore ground in the three deposits I have named is about 60 fms.; the present indications level after level are decidedly in favour of the ore ground becoming more lengthy and valuable with increased depth. Stoping in the 80 and 90 is being actively kept going, so as to give a sufficient supply of stuff to yield from 40 to 45 tons of lead ore per month, and if the bargains are prosecuted with vigour the probabilities are that the returns would be increased and the reserves added to. The mine is now getting into a creditable style of working, and I have, therefore, dispensed with surface labour as far as possible and applied more underground, and after carefully going into estimates I calculate the monthly cost at about 460*l.*, including merchants' accounts. I have discussed all these matters in detail with Mr. Green, and we agree in the opinion that if the mine is worked on the plan proposed, and the new sections of ground opened up as they now indicate, the profits on the year's working would be highly satisfactory, and having the advantage of new dressing and other appliances still greater progress is likely to follow. I thank you for your further support, and shall as hitherto spare no no labour or attention in your behalf. We have now in the bin about 70 tons of lead ore, 30 tons of which is sold, and I shall be prepared to sample 45 tons by Monday next, and also 20 tons of good quality copper ore soon after, waiting your instructions to sample.—Henry James.

The Chairman said that the business which they had to transact was really little more than formal, as the necessity of passing the resolution before them was fully considered when they last met, and there was no difference of opinion as to its being desirable. He had already explained that the plant and machinery were now complete, and that the monthly sale of from 45 to 50 tons of silver-lead ore and occasionally 20 or 25 tons of copper ore would leave them a good profit on the month's workings. The report which they had just heard read afforded additional proof that the mine was now in a satisfactory condition, and the lode at the 90 fm. level was looking as well as ever. But to pay off the liabilities (principally for the new machinery) a little more working capital was absolutely necessary, and he trusted that the amount which they were now to be authorised to raise would be the last that would be required from the shareholders. He would, therefore, propose that the resolution passed at the meeting on Jan. 22, to the effect "that under and by virtue of the powers contained in the Companies Act, 1862, sec. 12, the 5th clause of the Memorandum of Association, and the 32nd clause of the Articles of Association of this company, the directors are hereby authorised to increase the capital of this company by a sum not exceeding 4500*l.*" be and is hereby confirmed.

The motion was seconded by Mr. Bush, and upon being put to the meeting was carried unanimously, the usual complimentary vote of thanks to the Chairman terminating the proceedings.

NORTH HENDRE LEAD MINING COMPANY.

The seventh annual general meeting of shareholders was held at the offices of the company, Chester, on Friday, Jan. 25,

Mr. Henry R. Bowers in the chair.

The Secretary having read the notice convening the meeting, the minutes of the last annual meeting were read and confirmed. The reports and accounts, having been circulated, were taken as read, and the Chairman, in moving their adoption, said they met under very important circumstances. In the first place he would refer to the report of Capt. Ellis, their local manager, who by his ability and energy in the working of the mine had gained the full confidence of the board, and to the special report of Mr. Walter Eddy, who finished his report by "congratulating the shareholders on their possessing one of the richest mines of its size in the Principality." The principal development has been during the last six months; the west workings of the south driving have proved very rich in deposits of lead ore, and it is from this portion of the mine that the greatest part of the ore has been raised. The underground workings are now carried on in a most economical way, and upwards of 45,000*l.* worth of lead ore has been sold since the formation of the company in 1870, at a less expenditure than most other mines. He must, however, caution the meeting that this mine was a "flat" of a very peculiar kind, not possessing the absolute permanency which a vein or lode would do, and it was, therefore, impossible to calculate how long the present deposits would continue to yield the quantity of ore now being raised. It was stated at the last annual meeting that the directors had under their consideration the question of purchasing the royalties, but it was found impossible to carry this out. At the commencement of last year it was decided to apply for an extension of land, and a promise was obtained from the mortgagee that this should be granted; however, it was subsequently found necessary to open direct communication with Mrs. Lloyd, the owner of the property, and Mr. Wright rendered the directors important services in the negociations. This ultimately led to an arrangement by which the company undertook to assist in paying off the mortgage, in consideration of a new lease for an extended term being granted them of the whole of the Hendre Figillt estate (Great Hendre Mine) at a modified royalty. The great advantages of this proposal to the company were so manifest that they needed no justification on the part of the directors. It had, therefore, been deemed necessary to increase the capital of the company from 30,000*l.* to 50,000*l.*, by the creation of 8000 new shares, of 2*l.* 10s. each, and to allot 3000 of these shares to the present shareholders *pro rata*, at 1*l.* per share prem., with a deposit of 1*l.* per share; and, as the shares are now selling at 5*l.* 10s. to 6*l.*, this is considered to be advantageous to the shareholders. The premiums thus received will be credited to capital account, to repay the money at present borrowed from revenue, and enabling the shareholders to receive in dividends the amount now applied to the above purposes. He concluded by moving the adoption of the reports and accounts.

Mr. Bromley, in seconding the motion, remarked that he differed with the Chairman as to the reflections cast by him on the fact of the mine being only a "flat," and stated that some of the richest mines in North Wales raised a large quantity of lead ore from the deposits of a "flat," as at Talargoch and Minera Mines. They had no right to quarrel with the character of the formation as long as they were able to raise the present large quantities of ore, and he only hoped that it would continue for many years to come. He concluded his remarks by stating that he fully expected the directors would be able shortly to declare a dividend of 10s. per share, equal to 20 per cent. on the paid-up capital.

Mr. R. Williams, of Glyn Arthur, Denby, wished to know whether it would not be better to purchase the property rather than advance the money to pay off the mortgage?—The Solicitor of the company explained that this would not be practicable, as notice of foreclosure had been served, and the mortgage must be paid off on the 4th prox.

The report and accounts were then unanimously adopted.

The following resolutions were then passed:—1. That Messrs. John Williams Lloyd, Thomas Jones, and Adam Eyton be elected directors of the company.—2. That Mr. James Smith be re-elected auditor.—3. That the sum of 100*l.* be voted to the directors for their attendance during the ensuing year.

A cordial vote of thanks to the Chairman closed the meeting.

GLASGOW CARADON CONSOLIDATED COPPER MINING COMPANY.

The eighteenth general meeting of the shareholders was held on Monday at Glasgow,—Mr. Archibald Arrol presiding.

The report of the directors stated that the balance of profit and loss account was 2287*l.* 1s. 1d. The directors recommended that a dividend of 2½ per cent. be declared for the year, leaving 1391*l.* 8s. 9d. to be carried forward to next year's accounts.

The Chairman, in moving the adoption of the report, said it would be observed that the mine was still in the same favourable position as hitherto. The reserves were equal to those of any previous year. Unfortunately the low price of copper prevented them from getting such returns as they would have had under other circumstances. It was lower than it had been, perhaps, for years past, and the difference of their profits arose very much, almost entirely, he might say, from the low price of copper ore. Copper ore had been rather lower in relative value than the copper itself because the smelters, having a monopoly of the trade, anticipated rather a fall in the price of copper; and when they were buying the ore they paid such a price as would save themselves in the event of a fall, so that the company were doubly hit, so to speak, in a falling market. Then it would be noticed that they had not pressed the extract of the mine to such an extent as they might have done. They rather thought it prudent to reserve what was in the mine till better times, and go on paying their way or a little more. They considered the property a good one, and they hoped the shareholders would consider the policy they had pursued to be a good one. If the price of copper advanced the extracts of the company would go on increasing, because they had now got the new shaft down to the 90, and the mine was opening up to very profitable work as they deepened. A letter had been received on the morning of the meeting from Capt. Taylor, stating that the 90 was opening very satisfactorily, and the effect of the letter was to show that the mine was in a very satisfactory condition. The Chairman concluded by moving that the report be adopted.—Mr. Murray seconded the motion, which was unanimously adopted.

The Chairman next proposed that a dividend be declared at the rate of 2½ per cent. for the year ending Dec. 31, 1877.—Mr. M'Clure seconded the motion, which was also agreed to.

The retiring directors, Messrs. Andrew M'Tear and Archibald Arrol, were afterwards re elected, and a sum of 100*l.* was cordially voted to the directors for their services during the past year. The meeting then separated.

CENTRAL VAN LEAD MINING COMPANY.

The ordinary general meeting of shareholders was held at the Guildhall Tavern on Thursday,

Mr. E. Bingley in the chair.

The notice convening the meeting having been read by the Secretary, and the directors' report and statement of accounts having been taken as read,

The Chairman said he would endeavour as briefly as possible to explain their present position and prospects. For some time past they had been working on a lode parallel to, if not on, the Van lode itself, and they had reason to believe that they had at last come upon a lode that will repay the shareholders for their outlay provided the required funds can be supplied to develope it. The lode in the Central Van was highly promising if the Van lode continues its true magnetic course east and west, and has not split. But whether it be a parallel lode, or the best portion of the Vau lode deposited in the sett, he hoped they would have abundant reason to be satisfied with its contents. Capt. Roach's report stated that a shaft had been sunk 16 fms. upon this lode, and that he urges them to sink 10 fms. deeper, as he evidently expects by that time to meet with something cheering. There are shareholders in the company who still have confidence in this property, and this is only one instance of the many that might be given where a little more confidence and a little further outlay have been attended with like beneficial results. Kindly let them have this, or even a considerable portion of it, and he believed they would soon see the opinions of Capts. Roach and Francis borne out; they had no reason to doubt that a small outlay would in a few months probably result in a discovery of importance. It should also be remembered that for the money now asked for they offered the security of debentures, which not only carry a good rate of interest but also the option of exchanging them for shares at par. It, therefore, appeared to him that in taking up these debentures they ran no risk of loss, besides materially increasing the present, as well as the permanent, value of the property. He hoped the shareholders would take this view of the case, and that they would no longer hesitate to supply the directors with sufficient funds to develope the mine until that success which they all so earnestly desired and looked forward to would have become a substantial reality. He then moved "That the report of the directors and statement of accounts be and are hereby received and adopted."

Dr. Gibbon said he felt it was very desirable that they should now make an effort and raise the small amount that was required to determine the value of the lode in the new shaft. It was evident that the Van lode was not in East Van; it was not to the north, and, therefore, must be to the south, or in their direction. The directors had really, with the assistance of some of the shareholders, been keeping the mine at work for a long time back, and he really hoped the body of the shareholders would now do a little to assist them. If they would only subscribe 2s. 6d. per share a considerable sum would be raised. The directors, if thus assisted, were prepared to continue their efforts. Capt. Roach of the Van Consols and Glyn would undertake the management, and if only 1000*l.* were raised they had every reason to expect success.

After a few questions had been asked and answered the report and accounts were unanimously adopted. The election to the board of Mr. F. Cates was confirmed, and the retiring auditors, Messrs. T. S. Evans and Co. were re-elected.

Mr. Underwood remarked that he had as high an opinion of the mine as he ever had had, and that some day it would be as good a mine as the Van.

The meeting concluded in the usual manner.

THE PHOSPHOR BRONZE COMPANY.

The fourth annual general meeting of shareholders was held at the company's offices, on Wednesday,—Mr. James Rock in the chair.

The Secretary read the notice convening the meeting; and the report of the directors, with the balance-sheet and revenue accounts, were taken as read, and adopted. The dividend declared was 10 per cent. per annum. The following is the directors' report:—

Your directors have the pleasure of presenting the statements of account for the year ending Dec. 31, 1877, and beg to congratulate the shareholders on the continued prosperity of the company. The sales, despite the unprecedented depression in the iron and engineering trades, show a fair increase over those of the previous year, and a considerable number of new customers has been added to the company's already extensive *clientele*. These facts are a good augury for the future—particularly if trade in the iron and coal producing districts revives.

Considerable orders have been received from railway companies and engineering works, but the present chief consumers of the company's metal are unquestionably the steamship owners; and as phosphor bronze has, after extended trials, gained a very high reputation for the frictional parts of marine engines, this branch, taking into consideration its vast scope and constant requirements, bids fair to become a most important element in the continued success of the company.

The arrangement made with many influential brassfounders, whereby they are empowered and able to supply castings from the company's metal for local orders at a saving of expense and time to the consumer, has been found to work very satisfactorily—considerable orders for ingots having been received from various parts of the country. The arrangement referred to will become even more beneficial to the company's interests when a revival in trade takes place, as without this facility it would be impossible for the company to execute all orders for castings of phosphor bronze without causing great delay or having to establish branch foundries. In accordance with a resolution passed at the last annual general meeting, the whole of the amount—628*l.* 18s. 5d., then standing to the debit of patents' and preliminary account was written off by profit and loss account.

An interim dividend of 2½ per cent. for the half year ending June 30, 1877, has already been paid, and your directors recommend a further dividend sufficient to make the distribution for the past year equivalent to 10 per cent. per annum, free of income tax, on the paid-up capital. The accounts now presented have been audited by Mr. R. Payne and Mr. Ralph Peters, the auditors appointed at the last annual general meeting. In accordance with the Articles of Association, one director retires at this meeting, but is eligible for re-election. Your directors gladly avail themselves of this opportunity for acknowledging the zeal and ability displayed by the staff.

New Tyllwyd.—At the adjourned meeting of shareholders the reports and accounts were confirmed and passed.

Caldbeck Fells Lead and Copper Mining Company (Limited).—An extraordinary meeting of shareholders was held on Saturday at the offices, Devonshire-street, to consider the subject of

winding-up the company. It was resolved to take this step, Mr. Brockbank and Mr. Gath being appointed liquidators.

[For remainder of Meetings, see to-day's Journal.]

Registration of New Companies.

The following joint-stock companies have been duly registered:—

ARENDAL MINING AND SMELTING COMPANY (Limited).—Capital 48,000*l.*, in 4*l.* shares. To acquire land in the occupation of Messrs. Smith and Thommesen, parish of Froland, Oistad, Norway, together with all timber and minerals. The subscribers (who take one share each) are—W. Benson, Newcastle, coalowner; H. W. Lamb, Thornsett-road, Auerley, mineowner; S. W. Daukes, the Knole, Beckenham; S. York, Wolverhampton, merchant; J. H. Murchison, 8, Austinfriars, mine manager; J. H. Daw, 8, Austinfriars, mine agent; Alexander Kerly, 14, Great Winchester-street, solicitor. The directors are Messrs. Benson, Daukes, Lamb, and York, the qualification being the holding of 125 shares. The remuneration is 75*l.* per annum for each director, but when a 15 per cent. dividend is paid the directors will be entitled to 10 per cent. of the net profits, the 75*l.* being merged into this sum.

BEAUFORT TIN-PLATE COMPANY (Limited).—Capital 60,000*l.*, in 10*l.* shares. To acquire the business of the Beaufort Tin-Plate Company, and to carry on the business of tin-plate and terne-plate manufacturers, &c. The subscribers (who take one share each) are—D. Daves, Merthyr Tydfil; R. Givvin, Tithebarn-street, Liverpool, merchant; D. Phillips, Morreston, tinworks manager; T. Phillips, Merthyr Tydfil, gentleman; J. D. Phillips, Llansamlet, Glamorgan, tinplate manufacturer; W. Slater, Tithebarn-street, Liverpool, merchant; R. Strong, Tithebarn-street, Liverpool.

PARK SLATE AND SLAB COMPANY (Limited).—Capital 10,000*l.*, in 10*l.* shares. To enter into an agreement with the liquidator of the North Wales Slate Company for the acquisition and working of mineral property at Llanfrothen, Merionethshire. The subscribers (who take one share each) are—J. Gray, Eccles, near Manchester, reed manufaeturer; T. Scholes, Swinton, near Manchester, farmer; S. Mopcross, Leigh; J. Shovelton, Leigh, brewer; E. Shovelton, Leigh, draper; R. Curwen Birkenhead, merchant; H. Curwen, Preston. The directors are—Messrs. Scholes, Curwen, E. Shorelton, and James Gray.

DRIGGELT SILVER-LEAD MINING COMPANY (Limited). — Capital 10,000*l.*, in 1*l.* shares. To work for lead ore, barytes, and various other minerals at Caldbeck Fells, Cumberland. The subscribers (who take 100 shares each) are—J. Blackburn, Cockermouth, merchant, 100; W. L. Gibson, Newcastle, iron merchant; J. Jennings, Cockermouth, yeoman; J. Muir, Cockermouth, mine agent; M. H. Hawks, Gateshead, accountant: T. Scarfe, Cockermouth, mine agent; H. Hudspeth, Newcastle, contractor. The directors are—Messrs. Blackburn, Gibson, Hudspeth, Jennings, and Muir, the qualification being the holding of 100 shares.

RAILWAY WAGON REPAIRING COMPANY (Limited).—Capital 50,000*l.*, in 10*l.* shares. To establish wagon repairing works at various railway stations, junctions, &c. The subscribers (who take one share each) are—Alpheus Smith, South Norwood; J. W. Haslam, Alfreton; F. J. J. Smith, 79, Mark-lane; C. H. Perity, Mexborough; H. W. Franks, 14, Little Tower-street; F. G. Lockhurst, Haysingden, Herts; W. H. Pashley, Cambridge.

OYSTER MERCHANTS COMPANY (Limited).—Capital 20,000*l.*, in 5*l.* shares. To carry on the business of an oyster fishery at Emsworth. The subscribers (who take one share each) are—Hugh Hastings, Brixton Hill; F. Meyer, Brighton; D. H. Rucker, Clapham Park; F. Truman, 13, Compton terrace, N.; Alfred Bush, Brighton: E. B. Wilson, Brighton.

NATIONAL CO-OPERATION SUPPLY ASSOCIATION (Limited).—Capital 100,000*l.*, in 2*l.* shares. To carry on the general business of a supply store. The subscribers (who take 100 shares each) are—Thos. Saunders, Walton-on-Thames; R. W. H. Giddy, Beckenham; H. Robinson, C.B., 2, Emperor's Gate, W.; A Turnbull, Belsize-Park Gardens, N.W.. A. E. Nicholls, Bayston-road, N.; S. T. Sugme, Sandringham-road, Dalston; D. R. Mahoney, Sydenham.

COMMERCIAL DEPOSIT COMPANY (Limited).—Capital 25,000*l.*, in 5*l.* shares. To carry on the business of a land deposit office. The subscribers are—G. Slaney, Wavertree, Liverpool, 300; W. C. Woods, Higher Tranmere, 10; R. Williams, Liverpool, 150; A. J. Slaney, Waterloo-road, Manchester; H. Adams, 48, Westbourne-street, Liverpool, 10; T. Jones, Wavertree, 200; A. G. B. Edwards, Wavertree, 10.

ACCIDENTS IN MINES—THEIR CAUSES AND PREVENTION.

Although it is probable that so long as mining is carried on some accidents will happen in connection with it, there can be no doubt that by care and judgment their frequency may be materially diminished, and in order that the points which require especial attention may be well understood Mr. BAGOT has fully considered them in a convenient little volume,* in such a way as to show clearly the sources of accident which might be prevented. Mr. Bagot considers that in the solution of the problems—whether the principles of the Davy lamp hold good when the atmospheric pressure is as great as it is in the deep coal mines, and what effect the vibrating waves of sound may have on the flame within the lamp when the lamp is surrounded by an explosive mixture of gas, such as fire-damp—lies the secret of explosion after shot firing. The question of blowers of gas such as are met with in the Wigan district, especially in the Arley seam, is very fully discussed. There is a chapter on gob fire, or spontaneous combustion in the coal seam; the importance of the proper disposal of waste heaps and small coal is pointed out; and the relative value of the various kinds of explosives in the market is fully considered.

The barometer, Mr. Bagot mentions, is as certain a monitor of gas in the mine as it is of storm aboveground. The readings given by the barometer and thermometer as the pit bottom compared with those given by a duplicate set at surface give those in charge of the pit timely warning that goaves, stopped out gob-fires, old waste workings, and other parts of the seam in which gas is known to exist are in a dangerous state. Mr. Bagot contests the view put forth in the Times that the barometer will not indicate the presence of carbonic acid gas, and he regards it as a misfortune that the Mines Regulation Act did not require the instruments used to be proved up to any standard of accuracy. He states that the consequence of this is that many colliery-owners purchase their barometers from local dealers in optical instruments, and these are found upon comparison with a standard barometer to vary perhaps ⅝ in. at equal pressure. This statement, though tinged with truth, is dangerous and delusive. That it is desirous to have accurate instruments is beyond question, whether it be a barometer, thermometer, or chemical balance; but for all practical purposes the instruments used are amply sufficient, and we have seen excellent barometer for 18s. both in London and provincial towns. The delusion which Mr. Bagot creates can be readily understood. It is quite true, as Mr. Bagot states, that we sometimes find a cheap barometer which will register 30·2 (we have never seen one 30·6, although this would not affect the question) when the the standard barometer registers 30·0 inches; but since that same cheap barometer would, for example, register 28·2 instead of 28·0, and 32·2 instead. of 32·0 the error leads to no danger, and a pair of barometers, provided only they be true to each other, although differing 0·6 in. from standard would afford the mining engineers and miners just as certain warning as the most accurate instrument used at Greenwich. There is always much more danger in creating distrust in the instruments in use than in using second-class instruments. If Mr. Bagot were to show that barometers are in use which, for example, register "true" at 28·0 in., but indicate 31·6 upon increasing the pressure to 31·0 in., there would, indeed, be ground for complaint.

The chapter on Dangerous Practices not forbidden by the Mines Regulation Act naturally attracts attention, but here again the extreme narrowness of Mr. Bagot's views are seen. He condemns the knocker-line system of signalling from the pit-bottom to the bank, although this is still used in Durham, which is shown by the annual statistics to be one of the counties in which accidents are least frequent, the North of England districts being the safest in the kingdom, for reasons which have frequently been discussed in the *Mining Journal*, yet he is evidently in favour of electric communication, although in the only electric signalling apparatus which he seems to have examined he by accident, and when not near the instrument, produced an effect—an unintentional signal—which in practice might have sacrificed a cageful of lives. Again, he gives one statement which, if true, should at once have been judged sufficient to deprive the reckless individual of his certificate of competency, should he hold one, and to compel him ever after to remain at surface. He states that "on entering a heading he heard a noise like a blower of gas escaping, and on walking up to the spot he found a fuse burning in an unexploded shot hole, which he was unable to extinguish until he had cut it in half." But the sensational narrative is written by the same person, who declares that the real cause of half the accidents in this country is that a given practice is not recognised as dangerous until the accident takes place. He might have added that some actions are so improbable that no distinct order upon the subject is considered requisite. It is not usual, for example, to tell a soldier not to draw a charge from the muzzle of his gun with his teeth whilst a cap is on the nipple and the hammer at full cock; but, as Mr. Bagot truly remarks, persons who are constantly exposing themselves to danger are apt to become so familiar with it as finally to ignore it altogether.

The relative strength and merits of the exlosives used in mines is the title of the next chapter, but it has so much the appearance of having been written to the order of a certain uninflamable brattice-cloth maker, and of the makers of a particular explosive, that it may be passed over. There are also chapters on mechanical accidents that might be prevented, on overwinding, and on fire-damp and blowers of gas which are worth perusal. With regard to the different forms of safety-lamps in the market he regards the order of safety as Mueseler, Clanny, Stephenson, and Davy, and expresses the hope that at some future time the Mueseler lamp will be more generally used in England. He thinks that a common cause of spontaneous combustion in coal is the friction of the roof pressing on the seam and igniting the shale by the heat developed. Mr. Bagot wisely suggests that since accidents will occur in spite of every precaution lint, sweet oil, splints, a litter, Tyndall's respirator, brandy, and so on should be kept at every mine, and he directs attention to the various apparatus invented by Messrs. Galibert, Denayrouze, Fayot, Schwann, and Schultz. Mr. Bagot gives the actual number of deaths in one year from various kinds of explosives, but as he does not state the number of persons using each, or the work done, no useful conclusion can be drawn.

Throughout the volume Mr. Bagot appears to have given considerable attention to the subjects of which he treats, and although in some cases his views do not quite accord with those generally accepted as orthodox he has certainly brought together a large amount of information of much value, and which may be profitably studied both by miners and mine officials.

* "Accidents in Mines—their Causes and Prevention." By ALAN BAGOT, Mining Engineer. London: C. Kegan Paul and Co., Paternoster-square.

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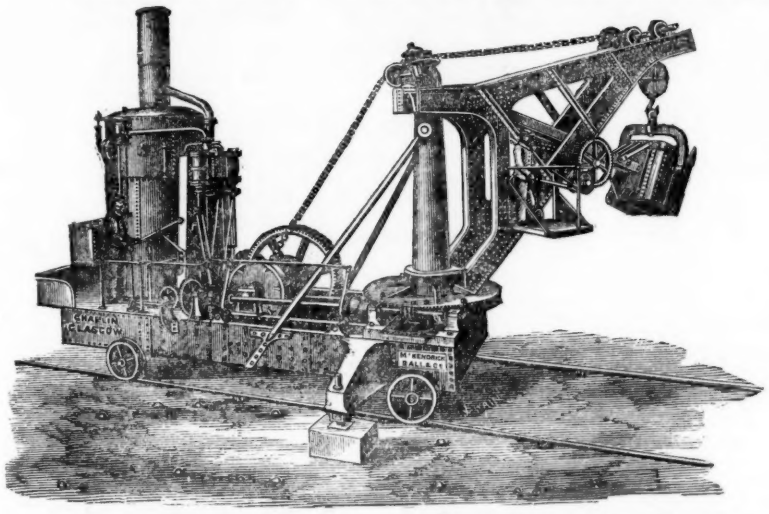

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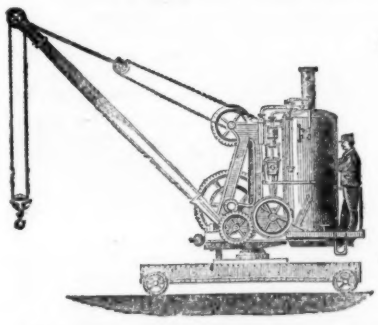

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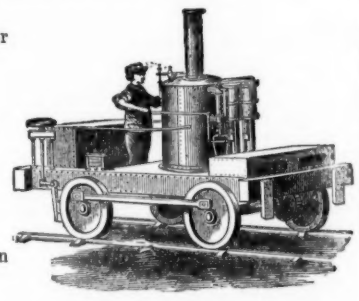

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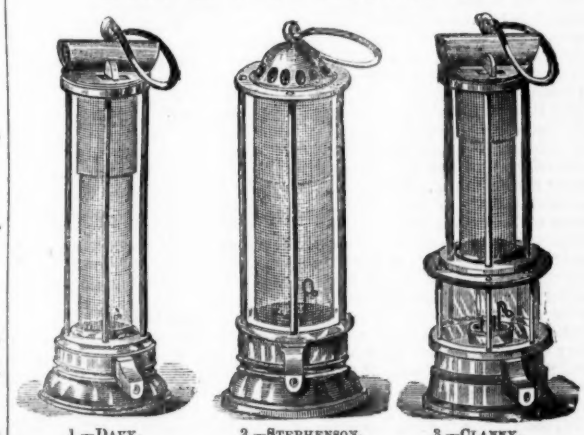

1.—DAVY. 2.—STEPHENSON. 3.—CLANNY.

N.B.—The whole of these Lamps are made by workmen who have had great experience, and pass through a careful examination before being sent out.
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LOW PRICES OF METALS.—In consequence of the present miserably LOW PRICES OF METALS, I have REDUCED the PRICES of my MINING MAPS. The "MAP OF CAMBORNE, ILLOGAN, REDRUTH, AND GWENNAP," published at 21s., I will send per book post (free) on receipt of 5s. 3d. "SAINT AGNES DISTRICT," same price. R. SYMONS, 11, PARADE, TRURO.

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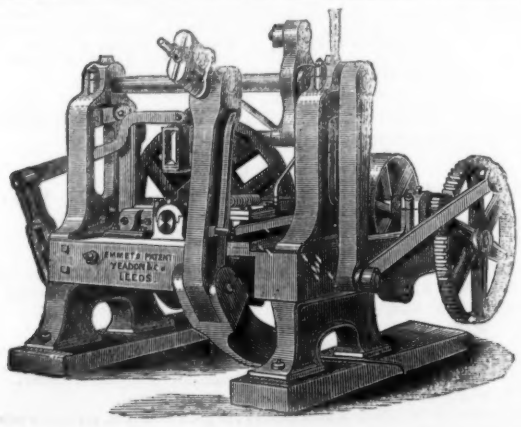

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This is the ONLY Machine which presses the Brick equally on BOTH sides, each plunger entering the mould plate ⅜ in., and turning out 12,000 SQUARE, SOLID, PRESSED Bricks per day, READY AT ONCE FOR THE KILN.

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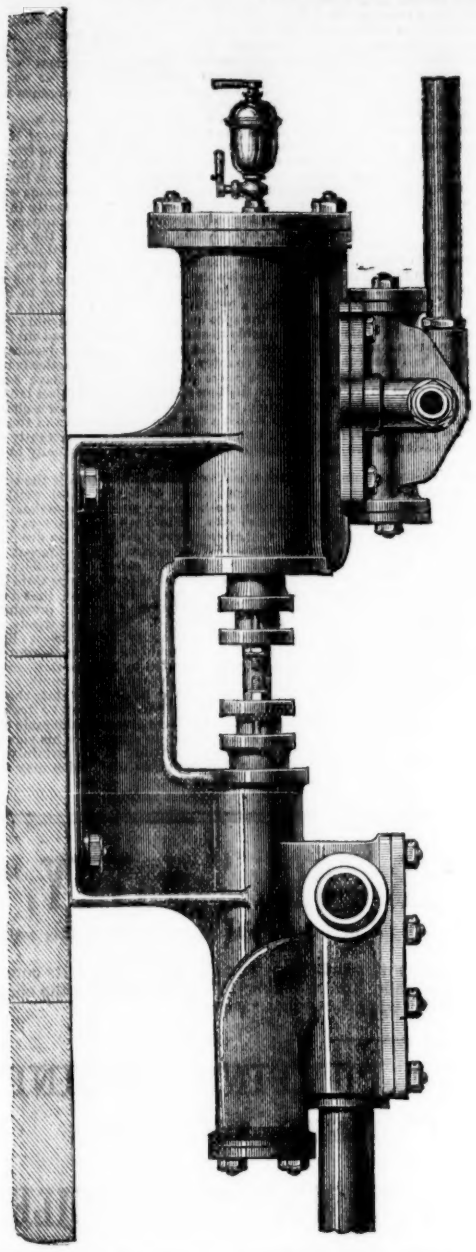
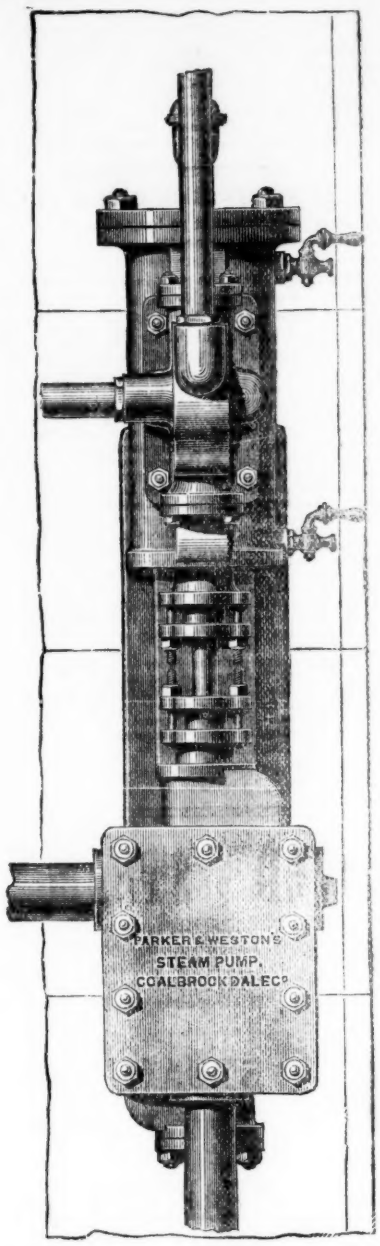
SINGLE OR COMPOUND ACTING STEAM PUMP.





SINGLE OR COMPOUND ACTING STEAM PUMP.

There can be little doubt that the rapid development and exploitation of mines is in no small measure indebted to the introduction and successful working of the direct acting steam pump; for certain it is that many similar undertakings could not have been taken in hand with the much more costly Cornish pumping gear, especially in situations where capital was necessarily limited. Reference has on several occasions been made to the comparative advantages existing between the old and the more modern types of pumping engines, so that it will be unnecessary to revert here to such a comparison. The present remarks will, therefore, be confined to a discussion of the so called direct acting steam pump, paying special regard to the compound steam pump forming the subject of the above illustration.

As is more or less known, the direct acting steam pump requires the construction to be without crank axle or fly wheel, and in the practical carrying out of this idea very simple well thought out methods of working the steam cylinder valves by the direct action of steam have from time to time been proposed. Assuming the advantages inherent to the direct acting steam pump to be known, allusion may be made to two defects which all the ingenuity of our engineers has up to the present time been unable to remove entirely.

The first of these disadvantages has its origin in the actual working of the most modern pumping method. Whereas in the old pumping system the drainage of mines was effected by a series of lifts, one pump repumping to the next, at distances of 60 to 80 yards. This modern system places the pumping engine at the mine bottom, and it is then made to force the water to the required surface, through an uninterrupted service of water pipes attached to the pump; thus it follows that a much greater back pressure is placed on the delivery valves of the pump, which pressure of course has to be overcome by the steam cylinder piston. The back pressure exerted on the delivery valves arises, of course, from the corresponding column of water which they have to support, and the magnitude of this pressure will be easily understood from the following practical example:—At a certain colliery a column of water 1040 ft. in height is maintained in one single uninterrupted lift, through a series of pipes 7 in. diameter, so that the height of this column of water alone exerts 484 lb. to the square inch, which is transferred to the steam cylinders of the corresponding direct acting steam pump. This back pressure, showing itself more or less prominently in direct acting steam pumps, is one of the main causes of the comparative excessive use of steam required for their working, which waste becomes all the more conspicuous when no condenser is attached to the pump, for it is a well known fact amongst engineers that the majority of well constructed engines, having a boiler pressure of (say) 70 lb., will only average a pressure on the cylinder of from 25 to 30 lb. per square inch throughout the stroke. Take among these one whose average pressure is 30 lbs. on every square inch, and for the sake of example attach a condenser having an average vacuum of 12 lb. pressure per inch cylinder piston area, then allowing 2 lb. for working the air pumps, we have 16 lb. per square inch gained by the application of the condensor. Similarly, take a pump 12 in. diameter of steam cylinder, 6 in. diameter of water cylinder, pumping against (say) 80 lb. water pressure, steam piston pressure (say) 25 lb. above atmospheric pressure, then if 5 lb. of this is assumed to be used up in overcoming the friction of the pump we have 20 lb. left to perform the working; and whereas the condition of the same pump would be as follows, if a condensor were attached:—13 lb. of the steam pressure would have its place taken by the vacuum, consequently 12 lbs. would be sufficient for the working of the pump, or a direct saving of over 50 per cent. would be gained when pumping at 80 lb. pressure in the water cylinder, which sufficiently shows the advantage of a condensor attachment to all direct acting steam pumps.

Another source of much annoyance to the users of direct acting steam pumps lies in the construction of the valves of the water barrel, which after some length of time become fitful and irregular in their working action, or are much given to excessive wear, as well as to leakage. Though the majority of direct acting steam pumps suffer from this defect, various improvements have been brought to bear on this important machinery portion, so that all pumps do not share this very objectionable feature in an equal degree, still there is ample room for improvement in this direction.

If the first defects alluded to are partly due to the "one lift" principle, and to our imperfect application of steam during and after its generation, the fundamental idea governing the direct acting steam pump, herewith illustrated, is undoubtedly a step in the right direction; for the fact of the steam being used expansively in Parkes and Weston's steam pump, whereby the stroke may be cut off at any time, certainly must result in an economy of steam, and so greatly reduce the validity of the objections commonly urged against this class of machinery on account of their comparatively large steam expenditure. It would be difficult, if not impossible, to explain lucidly the internal arrangements of this machine by means of the accompanying illustration, and as it would be impracticabl to publish sectional drawings of this pump, reference may be made to a general outline of the working of the valves and engines as given in the *Mining Journal* of May, 1875. The illustration shows a side and front view of one of the smaller sizes of these pumps, arranged to work vertically for situations where the space occupied is an object; but it can be well understood that a horizontal arrangement is preferable for deep mine drainage, and though the compound principle is not here illustrated, yet when a still greater economy is desirable the use of two cylinders of high and low pressures, placed one behind the other, is recommended, as then the steam can be cut off at from 50 to 90 per cent. in the high pressure, and expanded into the low pressure, whence the exhaust steam may be passed into a condenser. In the smaller sizes the two cylinders are cast together, and in the larger types the pump cylinder forms a stand, or base, for the whole to rest upon, whilst the delivery pipes can be taken from either sides of these pumps, making them more convenient for fixing. Though the consumption of steam may be somewhat larger in the employment of a number of smaller sized pumps in place of one pump of corresponding working efficacy, still it is a question which appears well worth trying whether such combinations of small sized pumps in situations where large direct acting pumps are found to be non-reliable in their action, so necessitating long or short stoppages of the pumping engines, would not prove more advantageous than the latter. Certain it is that even the choking up, or non-working, of one of the various small sized pumps in a mine or colliery would hardly be perceived, and the whole stoppage of the pumping engine would so become a reasonable impossibility; whereas at the present much time and money are often lost when one large sized pump is placed in such underground workings is found to be out of order. In this respect the ease with which two or more of the pumps herewith illustrated can be placed side by side, and so worked together or separately, whilst the power is being exactly proportioned to the work required to be done, will recommend their adoption for such situations, as well as for auxiliary purposes or for draining dip inclines. The valves which regulate the admission to and the release of the steam from the cylinders are entirely steam-moved, so dispensing with tappets, or other mechanical contrivances, so very liable to become deranged. In the meantime, with a view to illustrate the internal working of these pumps, it may be mentioned that they are all made with long strokes in proportion to their diameter, with a view of lessening the strokes per minute, and so ensuring less loss from clearance, as well as a diminished wear and tear of the pump valve. In conclusion, the makers of Parker and Weston's direct acting compound steam pumps are the Coalbrookdale Company, Shropshire.

PUMPING MACHINERY.—The improvements invented by Mr. J. STEPHENS, of Stonehouse, Gloucester, consists in making an ordinary slide valve with a larger lateral surface on one side of the ordinary steam and exhaust ports than is required to cover the said ports, and in the enlarged surface three ports or recesses, one of which by covering ports or passages from the main cylinder, and also ports or passages to the outer sides of pistons, which actuate an auxiliary slide valve, and the other two ports in the main slide valve making communication from the passages leading from the outer sides of the pistons working the auxiliary slide valve to ports leading to the main exhaust passage, and thereby causing the reciprocation of the auxiliary slide valve by steam taken from the main cylinder. The auxiliary slide valve causes the admission and exhaust of steam (taken from the main steam chest) to and from the outer ends of pistons that actuate the main slide valve, and thereby the main slide valve receives a reciprocating motion without any evers or outside gear. Another part of the invention applies to double action plunger pumps, in which one ram is used to work in the two barrels, and consists in utilising the distance pieces which couple the covers of the two barrels together as water passages to and from the pump barrels, and also placing the suction and delivery valves in the course for the water through the said distance pieces. The third part of the improvements consist in bolting a pump barrel directly to the steam cylinder, and packing the rod connecting the steam and water piston or plunger together with metallic packing.

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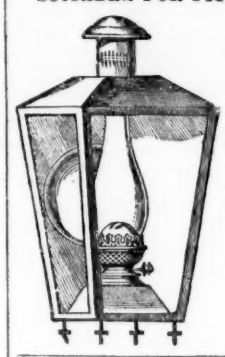

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No breakage of Chimneys from heat.
Cottons last three months.
Will burn any mineral oil.

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LOWER TEMPLE STREET,
BIRMINGHAM.

N.B.—Lamps made suitable for every purpose.
The BEST SIGNAL BELL MADE for MINING PURPOSES.
ILLUSTRATIONS ON APPLICATION.

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PERMANENT WAY RAILS, of all sections, made to order.
For sections and price, apply to—
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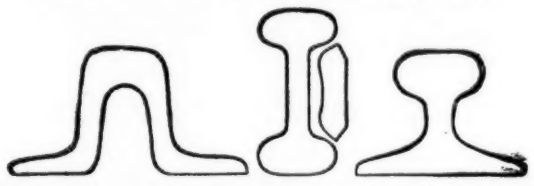

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Delivered at all Ports and Railway Stations in Great Britain.

BICKFORD'S PATENT FOR CONVEYING CHARGE IN SAFETY FUSE FIRE TO THE BLASTING ROCKS, &c.

Obtained the PRIZE MEDALS at the "ROYAL EXHIBITION" of 1851; at the "INTERNATIONAL EXHIBITION" of 1862 and 1874, in London; at the "IMPERIAL EXPOSITION," held in Paris, in 1855; at the "INTERNATIONAL EXHIBITION," in Dublin, 1865; at the "UNIVERSAL EXPOSITION," in Paris, 1867; at the "GREAT INDUSTRIAL EXHIBITION," at Altona, in 1869; TWO MEDALS at the "UNIVERSAL EXHIBITION," Vienna, in 1873; and at the "EXPOSICION NACIONAL ARGENTINA," Cordova, South America, 1872.

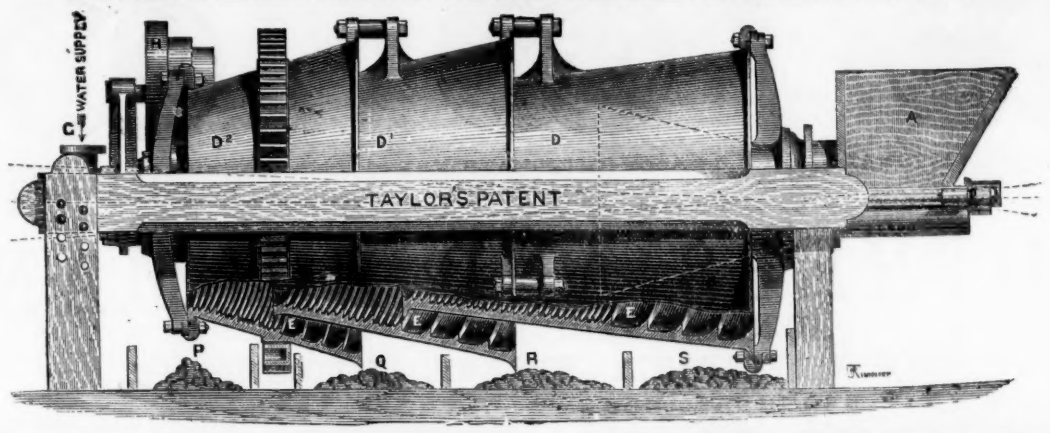
BICKFORD, SMITH AND CO., of TUCKINGMILL, CORNWALL; ADELPHI BANK CHAMBERS, SOUTH JOHN-STREET, LIVERPOOL; and 85, GRACECHURCH-STREET, LONDON, E.C., MANUFACTURERS AND ORIGINAL PATENTEES of SAFETY-FUSE, having been informed that the name of their firm has been attached to fuse not of their manufacture, beg to call the attention of the trade and public to the following announcement:—
EVERY COIL of FUSE MANUFACTURED by them has TWO SEPARATE THREADS PASSING THROUGH the COLUMN of GUNPOWDER, and BICKFORD, SMITH, AND CO. CLAIM SUCH TWO SEPARATE THREADS as THEIR TRADE MARK.

THE BIRMINGHAM WAGON COMPANY
(LIMITED)

MANUFACTURE RAILWAY CARRIAGES and WAGONS of EVERY DESCRIPTION, for HIRE and SALE, by immediate or deferred payments. They have also wagons for hire capable of carrying 6, 8, and 10 tons, part of which are constructed specially for shipping purposes. Wagons in working order maintained by contract. MANUFACTURERS also of IRONWORK, WHEELS, and AXLES. EDMUND FOWLER, Managing Director.
WAGON WORKS,—SMETHWICK, BIRMINGHAM.

THE TAVISTOCK IRONWORKS, ENGINEWORKS FOUNDRY, AND HAMMER MILLS,
TAVISTOCK, DEVON.
NICHOLLS MATHEWS, AND CO.
ENGINEERS, BRASS AND IRON FOUNDERS,
BOILER MAKERS AND SMITHS.
MAKERS OF
CORNISH PUMPING, WINDING, AND STAMPING ENGINES; STEAM CAPSTANS AND CRUSHERS; WATER-WHEELS; PUMP-WORK; SHOVELS, AND HAMMERED IRON FORGINGS OF EVERY DESCRIPTION.
Also of SPUR, MORTICE, MITRE, BEVIL, and other WHEELS, of any diameter up to 12 feet, made by Scott's Patent Moulding Machine, without the aid of patterns, and with an accuracy unattainable by any other means.
MACHINERY or FOREIGN MINES carefully prepared.
SECONDHAND MINING MACHINERY, in good conditon, always on sale, at moderate prices.

FIRST SILVER MEDAL AWARDED BY THE ROYAL CORNWALL POLYTECHNIC SOCIETY, 1876.



TAYLOR'S PATENT DRUM DRESSER,

FOR SEPARATING AND SIZING MINERAL AND OTHER SUBSTANCES.

By the aid of this invention any materials, which are of different specific gravity, can be concentrated and sorted mechanically, while in the case of ores the fine mineral is brought up with the larger particles instead of being washed into the waste—a most important feature.

This machine uses very little water in proportion to the quantity of material treated, and will be found a most useful and efficient dressing apparatus.

For further particulars, and to see machines at work, apply to the Patentee,

H. E. TAYLOR, 15, Newgate Street, Chester.

THOMAS TURTON AND SONS,

MANUFACTURERS OF

MINING STEEL of every description.

CAST STEEL FOR TOOLS. CHISEL, SHEAR, BLISTER, & SPRING STEEL.

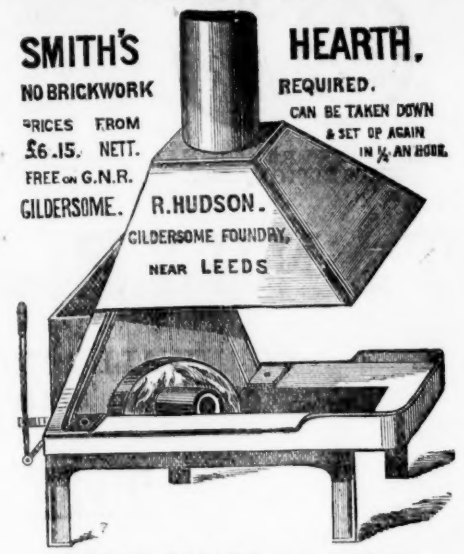
MINING TOOLS & FILES of superior quality.

EDGE TOOLS, HAMMERS, PICKS, and all kinds of TOOLS for RAILWAYS, ENGINEERS, CONTRACTORS, and PLATELAYERS.
LOCOMOTIVE ENGINE, RAILWAY CARRIAGE and WAGON SPRINGS and BUFFERS.

SHEAF WORKS AND SPRING WORKS, SHEFFIELD.

LONDON OFFICES.—35, QUEEN STREET, CITY. PARIS DEPOT—12, RUE DES ARCHIVES.
NEW YORK STORE—102, JOHN STREET.

IMPROVED IRON



GREAT SAVING IN ROOM.

SOLID DRAWN BRASS BOILER TUBES

FOR LOCOMOTIVE AND MARINE BOILERS

EITHER

MUNTZ'S OR GREEN'S PROCESS

MUNTZ'S METAL COMPANY (LIMITED),

FRENCH WALLS,

NEAR BIRMINGHAM.

BENNETTS' SAFETY FUSE WORKS
ROSKEAR, CAMBORNE, CORNWALL.

BLASTING FUSE FOR MINING AND ENGINEERING PURPOSES,
Suitable for wet or dry ground, and effective in Tropical or Polar Climates.

W. BENNETTS, having had many years experience as chief engineer with Messrs. Bickford, Smith, and Co., is now enabled to offer Fuse of every variety of his own manufacture, of best quality, and at moderate prices.
Price Lists and Sample Cards may be had on application at the above address
LONDON OFFICE.—H. HUGHES, Esq., 45, GRACECHURCH STREET.

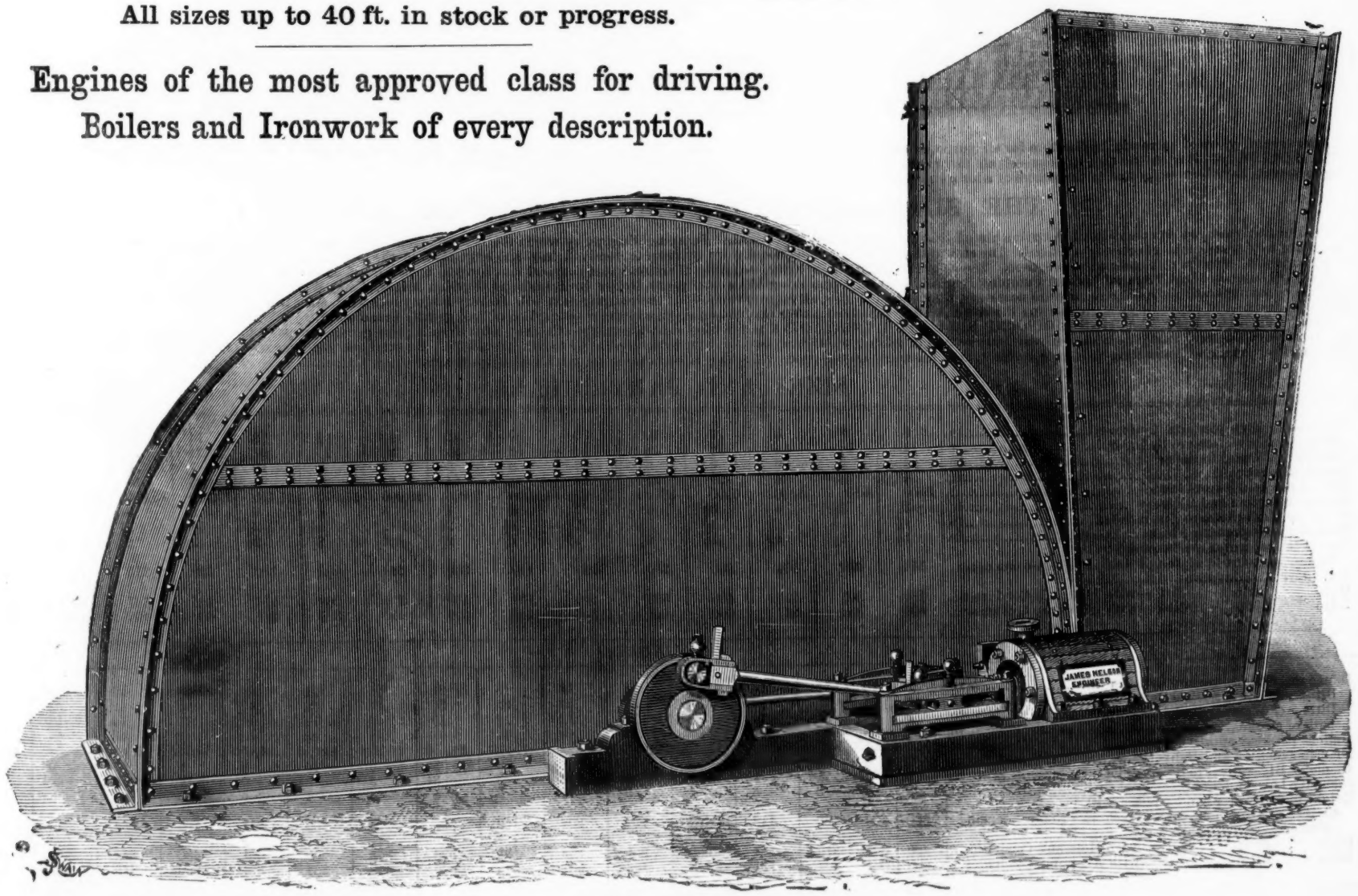
GUIBAL VENTILATING FAN

FOR COLLIERIES AND MINES.

PRICES AND PARTICULARS ON APPLICATION.

All sizes up to 40 ft. in stock or progress.

Engines of the most approved class for driving.
Boilers and Ironwork of every description.



MANUFACTURED BY

JAMES NELSON, Marine and Stationary Engine Works,

GATESHEAD-ON-TYNE.

PARIS INTERNATIONAL EXHIBITION, 1867.

VIENNA INTERNATIONAL EXHIBITION, 1873.

LONDON INTERNATIONAL EXHIBITION, 1874.

CORNWALL POLYTECHNIC SOCIETY, 1867 and 1873.

TANGYE BROTHERS AND HOLMAN,

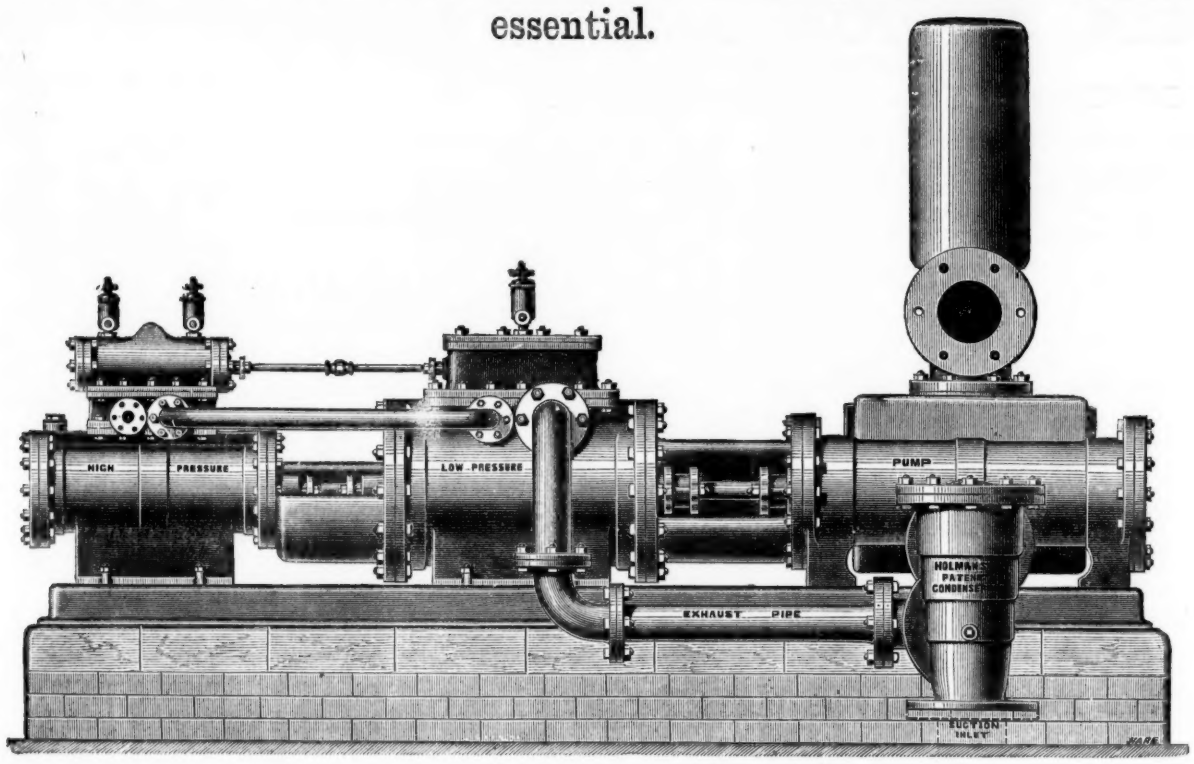
HYDRAULIC AND GENERAL ENGINEERS,

CORNWALL HOUSE, 35, QUEEN VICTORIA STREET, LONDON, E.C.,

AND BIRMINGHAM, (TANGYE BROTHERS), CORNWALL WORKS, SOHO.

THE "SPECIAL" DIRECT-ACTING COMPOUND STEAM PUMPING ENGINE

For use in Mines, Water Works, Sewage Works, and all purposes where Economy of Fuel is essential.



After several years of successful application for all purposes to which steam-driven pumps can be applied, THE "SPECIAL" STEAM PUMP STILL MAINTAINS THE FIRST POSITION IN THE MARKET, notwithstanding that it alone—of all direct-acting pumps—has been subjected to the great variety of severe tests that must be encountered in such a period of time. Some valuable improvements have been suggested in the course of a long experience, and their adoption has rendered the apparatus at once

THE SIMPLEST AND MOST CERTAIN IN ACTION.

The illustration shows an extension of the principle of this Pump to a Compound Steam Pumping Engine, by which the economical advantages resulting from the expansion and condensation of steam are very simply and effectively obtained. The steam after leaving the high-pressure cylinder is received into and expanded in the low-pressure cylinder, and is thus used twice over before being exhausted into the condenser or atmosphere. The Engine combines simplicity, certainty of action, great compactness, fewness of parts, and consequent reduction in wear and tear.

Several thousands of the "Special" Steam Pumping Engines, with high-pressure cylinders only, are in use in British and Foreign Mines, Water Works, &c.,—and for confined situations, or where Engines of a comparatively small size only are necessary, they will still meet all requirements—but their application will be very largely increased, since it has been found practicable to embrace the important features of expanding and condensing the steam, so that increased power may be obtained, and the consumption of fuel greatly economised.

THE "SPECIAL" DIRECT-ACTING COMPOUND STEAM PUMPING ENGINE is the most simple appliance for deep mine draining and general purposes of pumping ever practically developed, and the first cost is very moderate compared with the method of raising water from great depths by a series of 40 to 50 fathom lifts. No costly engine-houses or massive foundations, no repetition of plunger lifts, ponderous connecting rods, or complication of pit-work are required, while they allow a clear shaft for hauling purposes.

SIZES AND PARTICULARS.

Diameter of High-pressure Cylinder.....In.	8	8	8	10	10	10	10	12	12	12	12	14	14	14	14
Ditto of Low-pressure Cylinder .....In.	14	14	14	18	18	18	18	21	21	21	21	24	24	24	24
Ditto of Water Cylinder .....In.	4	5	6	5	6	7	8	6	7	8	10	7	8	10	12
Length of stroke .....In.	24	24	24	24	24	24	24	24	24	24	24	36	36	36	36
Gallons per hour approximate	3900	6100	8800	6100	8800	12,000	15,650	8,800	12,000	15,650	24,450	12,000	15,650	24,450	35,225
Diameter Suction and Delivery .....In.	3	3½	4	3½	4	5	6	4	5	6	8	5	6	8	9
Diameter High-pressure Steam Inlet.....In.	1¼	1¼	1¼	1¼	1¼	1¼	1¼	2¼	2¼	2¼	2¼	2¼	2¼	2¼	2¼
Diameter Low-pressure Steam Exhaust.....In.	1½	1½	1½	1¾	1¾	1¾	1¾	2½	2½	2½	2½	2½	2½	2½	2½
Height in feet water can be raised with 40 lbs. pressure per square inch in cylinder ..... Non-condensing...	360	330	160	360	250	184	140	360	264	202	130	360	275	175	122
Ditto ditto ditto—with Holman's Condenser...	480	307	213	480	333	245	187	480	352	269	173	480	367	234	162
Ditto ditto ditto—with Air-pump Condenser...	600	384	267	600	417	306	335	600	440	337	216	600	459	203	203

CONTINUED.

Diameter of High-pressure Cylinder .....In.	16	16	16	16	18	18	18	18	21	21	21	24	24	24	30	30
Ditto of Low-pressure Cylinder .....In.	28	28	28	28	32	32	32	32	36	36	36	42	42	42	52	52
Ditto of Water Cylinder .....In.	8	10	12	14	8	10	12	14	10	12	14	10	12	14	12	14
Length of stroke .....In.	36	36	36	36	48	48	48	48	48	48	48	48	48	48	48	48
Gallons per hour approximate	15,650	24,450	35,225	47,950	13,650	24,450	35,225	47,950	24,450	35,225	47,950	24,450	35,225	47,050	35,225	47,950
Diameter Suction and Delivery .....In.	6	8	9	10	6	8	9	10	8	9	10	8	9	10	9	10
Diameter High-pressure Steam Inlet.....In.	2½	2½	2½	2½	3	3	3	3	3½	3½	3½	4	4	4	5½	5½
Diameter Low-pressure Steam Exhaust.....In.	3	2	3	3	3½	3½	3½	3½	4	4	4	5	5	5	6½	6½
Height in feet water can be raised with 40 lbs. pressure per square inch in cylinder ..... Non-condensing..	360	230	160	118	456	292	202	149	397	276	202	518	360	264	562	413
Ditto ditto ditto—with Holman's Condenser...	480	307	213	154	603	389	269	198	528	363	269	691	480	352	750	550
Ditto ditto ditto—with Air-pump Condenser...	600	384	267	191	750	486	337	248	660	450	337	864	600	440	937	689

PRICES GIVEN ON RECEIPT OF REQUIREMENTS.

Any number of these Engines can be placed side by side, to work in conjunction or separately as desired, thereby multiplying the work of one Pump to any extent.

NORTH OF ENGLAND HOUSE ... ... TANGYE BROTHERS AND RAKE, ST. NICHOLAS BUILDINGS, NEWCASTLE-ON-TYNE.
SOUTH WALES HOUSE... ... ... TANGYE BROTHERS AND STEEL, Tredegar Place, NEWPORT, Mon.; and Oxford Buildings, SWANSEA.

AWARDED THE PRIZE MEDALS AT LEEDS, MANCHESTER, AND WREXHAM EXHIBITIONS, 1875 AND 1876.

HADFIELD'S STEEL FOUNDRY COMPANY,

ATTERCLIFFE, SHEFFIELD,

DEVOTE THEIR EXCLUSIVE ATTENTION TO THE MANUFACTURE OF

CRUCIBLE STEEL CASTINGS, for Engineering and Mining Purposes,

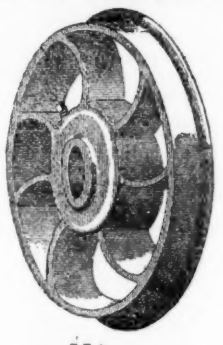
AND ARE THE SOLE MAKERS OF

Hadfield's Self-oiling Steel Wheels

(PATENTED).

These possess advantages held by no other wheels, and are specially adapted for Collieries, Ironstone Mines, Slate Quarries, Lead and Copper Mines, &c., &c., where LOOSE Wheels are used (*i. e.*, those revolving upon their own axles). By the old system of lubricating loose wheels, it is well known this is attended with constant labour and excessive waste; and as so little of the grease or oil applied reaches the wearing surfaces, and as re-greasing can only take place at fixed parts of the workings, the bosses of the wheels and bearings of the axles soon become dry, and cut each other: thus causing enormous wear and tear, and necessitating extra labour, haulage power, and expense. These and numerous other defects are entirely remedied by these wheels, as will be readily seen from the following illustrations and advantages claimed.

N.B.—Price per Set of Wheels and Axles (ready for use) forwarded on receipt of—1. Diameter of Wheel on tread. 2. Width of tread. 3. Diameter and total length of axle, also whether No. 74 or 75. 4. Rail gauge. 5. Rolling load.



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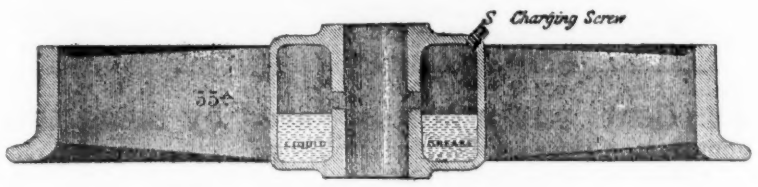
66A Registered



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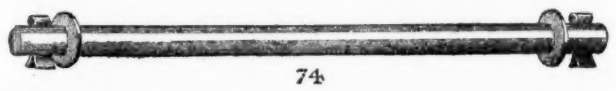

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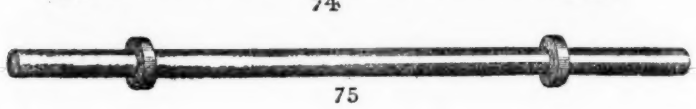

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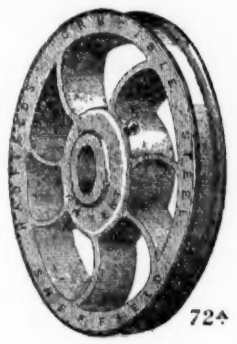
34B



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35A

This Advertisement is varied from time to time.

[This Sheet of Drawings is Copyright.

The following are a few of the numerous Advantages claimed by the above Self-oiling Wheels:—

1.—Two-thirds (at least) less grease or oil is required than at present used by any known method of lubricating Mining Wagons, whether by hand, machine, or otherwise.
2.—These wheels effect a very great saving in haulage power; also wear and tear—being so constructed as never to allow the bearings to become dry. The revolving of the wheel leads out the oil as required, and immediately the wagon stops the lubricator ceases its action,
3.—No waste of grease can occur, no matter in what position the wagon may be placed, when discharging its contents (even if up side down); and when the wagons are not in use it is utterly impossible for any grease to escape, as it is all stored below the outlet (as shown above).
4.—When once these wheels have been charged with liquid grease (which can be done by any inexperienced person) they do not require any attention or re-greasing whatever for several weeks or even months afterwards, in proportion to the distance travelled.
5.—These wheels can be readily fixed to any description of either wood or iron corves now in use, whether the wheels are upon the inside or outside of the frame.
6.—They are exceedingly simple in construction, have no detail, and are not liable to get out of order.
7.—They possess great strength, durability, and extreme lightness, being made of Crucible Steel.

Where **FAST** Wheels and Axles are adopted instead of Loose ones, *as shown above*, see our Illustrated Sheets of Drawings Nos. 2 and 3 of

Crucible Steel Wheels and Axles, fitted complete by Hadfield's Patent Method, and Hadfield's Self-oiling Pedestals.

HARRIS'S PATENT WROUGHT-IRON WINDOWS.

DOME AND OTHER ROOF LIGHTS, FLOOR AND PAVEMENT LIGHTS, ETC.

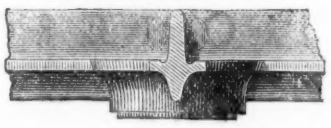
GREAT BRITAIN,
UNITED STATES OF AMERICA,

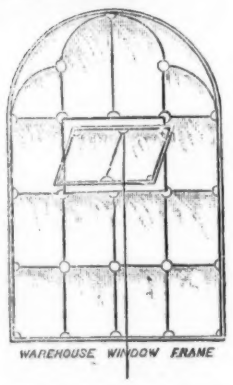
ARE STRONGER, SUPERIOR, AND CHEAPER THAN ANY OTHER METAL SASHES YET PRODUCED—COST LESS FOR GLAZING—ARE AS CHEAP IN MANY CASES AS WOOD

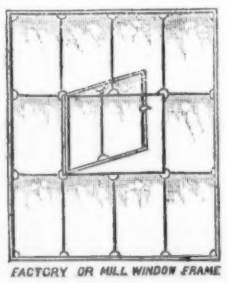
Private Houses,
Parsonage Houses,
Farm Houses,
Churches,
Chapels,
Schools,

ILLUSTRATED CATALOGUES ON APPLICATION.

PATENTED IN







FRANCE,
GERMANY, AND BELGIUM.

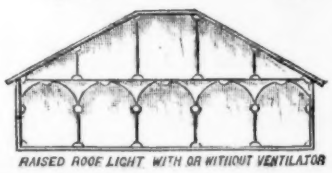
—CAN BE DESIGNED AND MANUFACTURED TO SUIT ANY STYLE OF ARCHITECTURE OR POSITION WHERE A WINDOW MAY BE REQUIRED.
ARE BEING EXTENSIVELY USED IN—

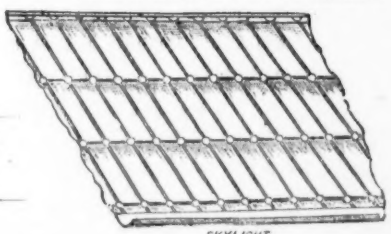
Lunatic Asylums, &c.,
Public Buildings, Banks,
Wharves, Warehouses,
Factories, Mills,
Breweries, &c.,
Engine Houses.

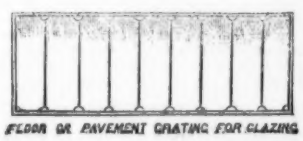
ILLUSTRATED CATALOGUES ON APPLICATION.

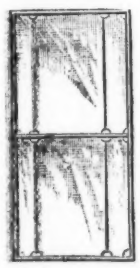
Security is obtained in these Skylights without Guard Bars, and with less obstruction to Light.

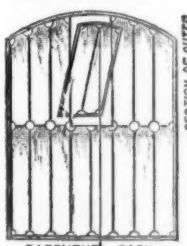
EXPORT.











In Basement Storeys and Exposed Positions Shutters and Guard Bars are dispensed with.

HOME AND

Sole Maker—**J. T. HARRIS**, Engineer, Ironfounder, and Manufacturer,

SAFE, STRONG ROOM, AND PARTY WALL DOORS, AND EVERY KIND OF CONSTRUCTIONAL AND BUILDERS' IRONWORK, LIFTS, HOISTS, ELECTRIC BELLS AND TELEGRAPHS, &c.

90, CANNON STREET, LONDON, E.C.; AND BEAUFORT IRONWORKS, BRISTOL.

H. R. MARSDEN, PATENTEE AND ONLY MAKER OF THE WELL-KNOWN BLAKE MACHINES,

ORE CRUSHERS AND STONE BREAKERS,

WITH THE

New Patent Reversible

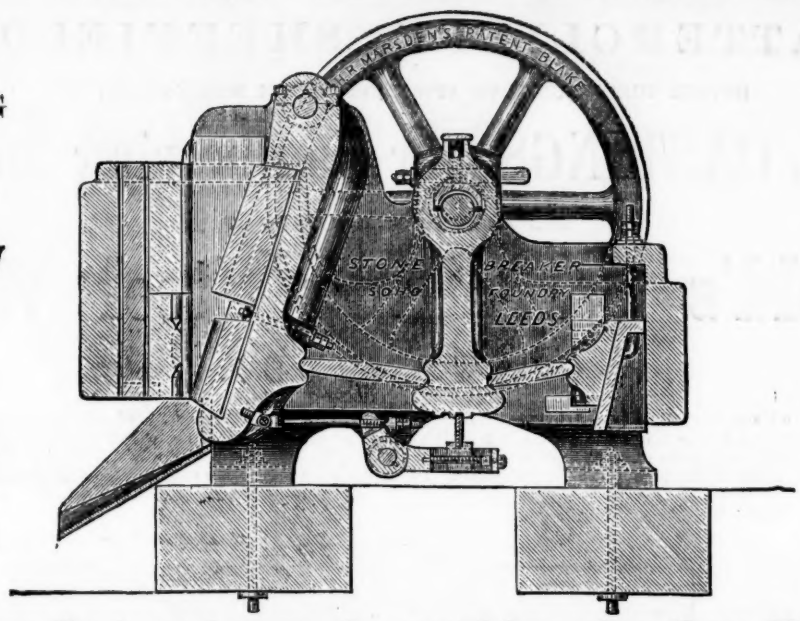
CRUSHING OR CUBING JAWS,

WHICH ARE CONSTRUCTED OF A PECULIAR MIXTURE OF METAL, WEARING

Four times longer than any other.

60 GOLD AND SILVER MEDALS.

OVER **2000** NOW IN USE.



For Crushing to any degree of Fineness, or Breaking to a required size.

Her Majesty's Government
USE THESE MACHINES
EXCLUSIVELY,
ALSO ALL THE GREAT
Mining Companies of the World.

H. R. M. has long observed the want of cheaper machines,
STONE AND ORE CRUSHERS,
And has at length, by means of improved appliances for the production thereof, been enabled to reduce the prices, yet keep up at the same time the well-known strength of construction. Reduced prices on application.

FIFTY per Cent., and upwards, saved by using these Machines.

TESTIMONIAL FROM MESSRS. JOHN TAYLOR AND SONS.
6, Queen-street-place, May 10, 1877.

DEAR SIR,—We have adopted your Stone Breakers at many of the mines under our management, and are pleased to be able to state that they have in all cases given the greatest satisfaction. We are, yours faithfully, JOHN TAYLOR AND SONS.
H. R. Marsden, Esq.

Royal Agricultural Show, Liverpool, July, 1877.

DEAR SIR,—I have broken over 40,000 tons of very hard LIMESTONE into ROAD METAL, for the Newport and other Road Trusts, in your PATENT STONE BREAKER, AND ALL WITH ONE PAIR OF JAWS, which are STILL IN USE. I do not think at all, but am quite sure yours are the only Machines which fully perform the work you set them out to do, and there are none in the Show can at all compare with them. Yours, truly,
H. R. Marsden, Esq. WILLIAM PRICE, Contractor, Gold Cliff, Monmouth.

INTENDING BUYERS ARE CAUTIONED AGAINST PURCHASING OR USING ANY INFRINGEMENT OF THE NUMEROUS PATENTS OF H. R. MARSDEN.

ILLUSTRATED CATALOGUES, TESTIMONIALS, and every information, on application to:—

H. R. MARSDEN, SOHO FOUNDRY, LEEDS, ENGLAND.
ONLY MAKER OF SAULT'S PATENT SYPHON CONDENSER.

TO COLLIERY AND MINE OWNERS.
R. HUDSON'S PATENT STEEL CORVES OR "TRAMS."

Patented July, 1875, and January, 1877.

Entire new principle, saving three-quarters to 2 cwts. "dead" weight per corve. Will hold 2 to 3 cwts. more coal than the ordinary kind, *without increasing the outside dimensions.* Adopted by—

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